DOE/EIS - 0427

Final Environmental Impact Statement

Grapevine Canyon Wind Project

May 2012

Volume I




Lead Agency:

U.S. Department of Energy,
Western Area Power Administration

Cooperating Agencies:

U.S. Department of Agriculture,
Forest Service, Coconino National Forest

Arizona State Land Department

Western
AREA POWER
ADMINISTRATION

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VOLUME I

VOLUME II

COVER SHEET

LEAD FEDERAL AGENCY: U.S. Department of Energy (DOE), Western Area Power Administration (Western)

COOPERATING AGENCIES: U.S. Department of Agriculture, Forest Service (Forest Service), Coconino National Forest and Arizona State Land Department

TITLE: Final Environmental Impact Statement for the Grapevine Canyon Wind Project, DOE/EIS-0427

LOCATION: Coconino County, Arizona

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ABSTRACT: The Grapevine Canyon Wind Project proposed by Foresight Flying M, LLC (Foresight) would include: 1) a wind energy generating facility up to 500 megawatts; 2) a 345-kilovolt (kV) electrical transmission tie-line; and 3) a 345-kV electrical interconnection switchyard that would be owned and operated by Western. The wind energy generating facility would be located on private land and trust land administered by the Arizona State Land Department. The electrical transmission tie-line would be located on private and State trust lands, as well as Federal lands administered by the Forest Service. The interconnection switchyard would be located entirely on Forest Service-managed lands. The project is located about 28 miles south and east of Flagstaff, Arizona in Coconino County, extending from the proposed wind generating facility south of Meteor Crater to the proposed switchyard just east of Mormon Lake, Arizona. Foresight has applied to Western to interconnect the proposed wind energy generating facility to Western's power transmission system on its Glen Canyon-Pinnacle Peak 345-kV No. 1 and No. 2 transmission lines. Additionally, Foresight has applied to the Forest Service for a special use permit authorizing the use of a 200-foot-wide right-of-way for a minimum period of 50 years to accommodate the construction and operation of the proposed 345-kV electrical transmission tie-line. The EIS includes a description of Western's and the Forest Service's proposed Federal actions and a no action alternative and an analysis of their environmental impacts.

The Final EIS is comprised of the previously published Draft EIS with additions and revisions added in response to comments on the Draft EIS and a comment and response chapter. Additions and revisions to the EIS are delineated with a vertical line in the left margin. Western's Record of Decision will be published no sooner than 30 days from the publication in the Federal Register of the U.S. Environmental Protection Agency's Notice of Availability for this Final EIS. The Forest Service will publish its Record of Decision directly before the 30-day Notice of Availability to coincide with its 45-day administrative review period.

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ACRONYMS AND UNITS OF MEASURE

ACRONYMS

ABPP	Avian and Bat Protection Plan
ACCAG	Arizona Climate Change Advisory Group
ACC	Arizona Corporation Commission
ACHP	Advisory Council on Historic Preservation
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
ADT	Average daily traffic
AGFD	Arizona Game and Fish Department
AIRFA	American Indian Religious Freedom Act
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
APIF	Arizona working group of Partners in Flight
Foresight	Foresight Flying M, LLC
APWRA	Altamont Pass Wind Resource Area
ARS	Arizona Revised Statute
ASLD	Arizona State Land Department
ATVs	All-terrain vehicles
AU	Animal Unit
AUM	Animal Unit Month
AZPDES	Arizona Pollutant and Discharge Elimination System
BA	Biological Assessment
BBS	Breeding Bird Survey
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Department of the Interior, Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CEC	Certificate of Environmental Compatibility
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DOE	U.S. Department of Energy
ECP	Eagle Conservation Plans
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Fields
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
F	Fahrenheit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
Foresight	Foresight Flying M, LLC
Forest	Coconino National Forest
Forest Plan	Coconino National Forest Land and Resource Management Plan
Forest Service	U.S. Department of Agriculture, Forest Service
FS #	Forest Service Road/Route Number
FSH	Forest Service Handbook

GHG	Greenhouse Gas
GIS	Geographic Information Systems
HAP	Hazardous Air Pollutants
I-40	Interstate 40
IBA	Important Bird Area
ID	Interdisciplinary
KOP	Key Observation Point
LED	Light-emitting diode
LGIP	Large Generator Interconnection Procedures
MBTA	Migratory Bird Treaty Act
Met	Meteorological
MIS	Management Indicator Species
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves and Repatriation Act
NEMA	National Electrical Manufacturer's Association
NESC	National Electric Safety Code
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NO_2	Nitrogen Dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	Nitrogen Oxide
NPS	National Park Service
NRCS	U.S. Department of Agriculture, Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTIA	National Telecommunication Information Administration
NWI	National Wetlands Inventory
O&M	Operation and Maintenance
O_3	Ozone
OHV	Off-highway Vehicle
OSHA	Occupational Health and Safety Administration
PA	Programmatic Agreement
Pb	Lead
PM	Particulate Matter
PSD	Prevent Significant Deterioration
ROD	Record of Decision
RPA	Rural Planning Area
RPM	Resource Protection Measure
RV	Recreational Vehicle
SCADA	Supervisory Control and Data Acquisition
SF_6	Sulfur Hexafluoride
SHPO	State Historic Preservation Office
SIL	Scenic Integrity Level
SMS	Scenery Management System
SO_2	Sulfur Dioxide
SPCC	Spill Prevention, Control and Countermeasure Plan
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan

Tariff	Open Access Transmission Service Tariff
TCP	Traditional Cultural Property
TMR	Travel Management Rule
Transcon	Transcon Environmental, Inc.
USACE	U.S. Army Corps of Engineers
USC	United States Code
USD	Unified School District
USDA	United States Department of Agriculture
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service
VMS	Visual Management System
VQO	Visual Quality Objective
WEST	Western Ecoystems Technology, Inc.
Western	Western Area Power Administration
WMAs	Wildlife Management Areas
WRCC	Western Regional Climate Center
WTG	Wind Turbine Generator
ZHHPA	Zuni Heritage and Historic Preservation Office

UNITS OF MEASURE

A	Ampheres
AADT	Annual Average Daily Traffic volume estimate (bi-directional)
AU	Animal Unit
AUM	Animal Unit Month
bls	Below Land Surface
dB	Decibel
dBA	A-weighted decibel
ft bls	Feet Below Land Surface
Hz	Hertz
kV	Kilovolt
G	Guass
gpd	Gallons per Day
gpd/ft	Gallons per Day per Foot
gpm	Gallons per Minute
Ldn	Day-night Noise Level
Leq	Equivalent Sound Level
mph	Miles per Hour
MW	Megawatt
MWh	Megawatt Hour
NEG	Annual Average Daily Traffic volume estimate, decreasing highway milepost numbers
POS	Annual Average Daily Traffic volume estimate, increasing highway milepost numbers
tpy	Tons per Year
TWh/yr	Terawatt-hours per Year
V	Volts
μ/m	Micrometer

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

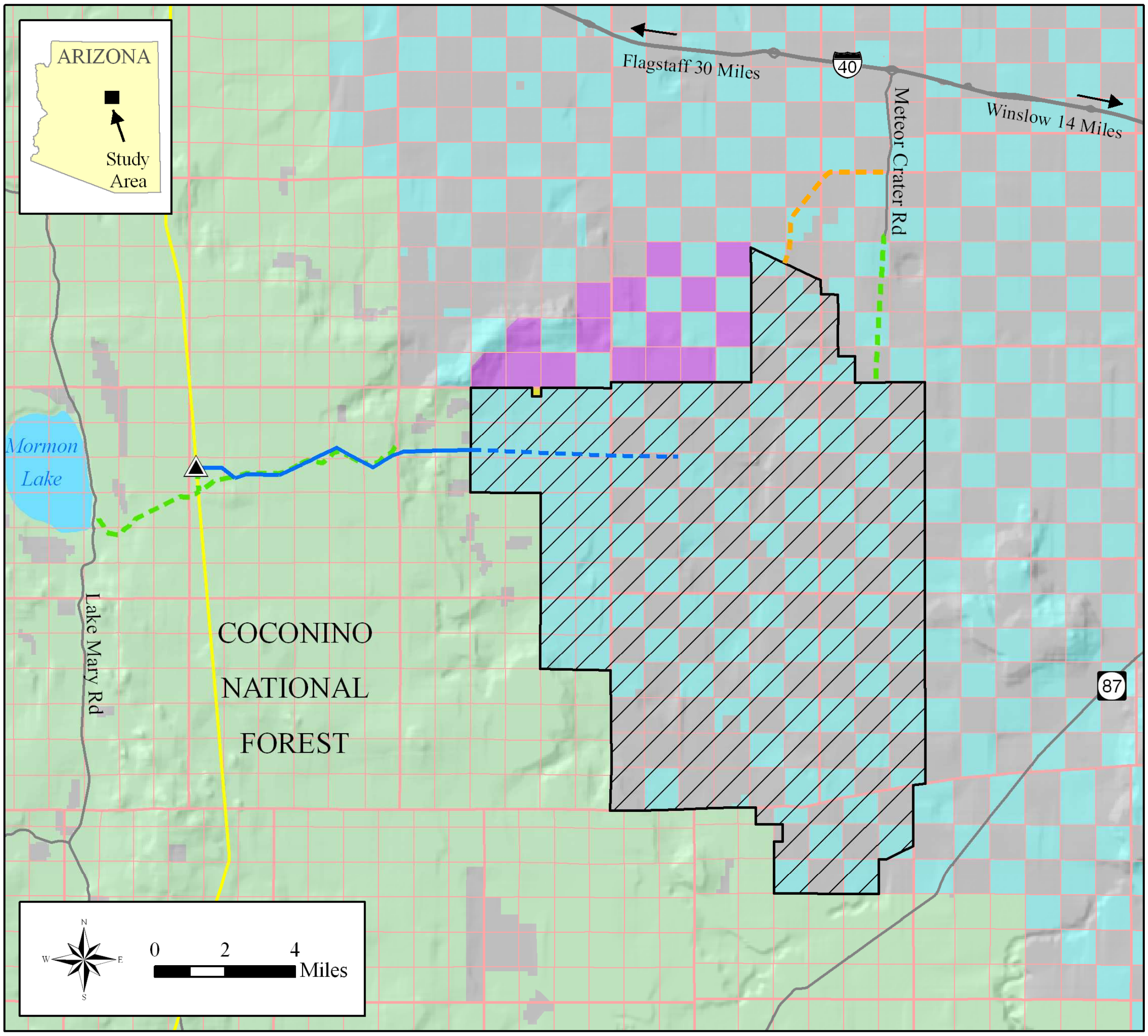
Foresight Flying M, LLC (Foresight) proposes the development of the Grapevine Canyon Wind Project in Coconino County, Arizona. The project is located approximately 18 miles southwest of Winslow and 28 miles southeast of Flagstaff (Figure ES.1-1).

The project would include three main components: 1) a wind energy generating facility up to 500 megawatts (MW); 2) a 345-kilovolt (kV) electrical transmission tie-line; and 3) a 345-kV electrical interconnection switchyard and facilities that would be owned and operated by Western Area Power Administration (Western). The wind energy generation component would be located on private land and trust land administered by the Arizona State Land Department (ASLD). The electrical transmission tie-line would be located on private and State trust lands as well as Federal lands administered by the U.S. Department of Agriculture, Forest Service (Forest Service). The interconnection switchyard would be located entirely on Forest Service-managed lands.

The wind energy generating facility may be built in two or more phases over a period of years with an initial construction schedule for the first phase between 12 to 18 months. Construction is expected to begin in 2012.

Foresight has applied to Western to interconnect the proposed wind energy generating facility to Western's power transmission system on its Glen Canyon-Pinnacle Peak 345-kV No. 1 and No. 2 transmission lines. Additionally, Foresight has applied to the Forest Service for a special use permit authorizing the use of a 200-foot-wide right-of-way for a minimum period of 50 years to accommodate the construction and operation of the proposed 345-kV electrical transmission tie-line.

Western would seek approval and authorization from the Forest Service to construct and operate the proposed interconnection switchyard on an approximately 15-acre parcel beneath the Glen Canyon-Pinnacle Peak transmission lines, if the interconnection request is approved.



Legend

- Wind Park Study Area
- Proposed 345-kV Tie-line Alignment
- Proposed 345-kV Tie-line Alignment (Alignment to Be Determined)
- Proposed New Site Access Road
- Existing Site Access Road
- Proposed Interconnection Switchyard
- Existing Western 345-kV Transmission Lines
- Bureau of Land Management
- Forest Service
- Arizona Game and Fish Department
- Private
- State Trust

Applicant's Proposed Project

Grapevine Canyon Wind Project

FIGURE ES.1-1

ES.2 PURPOSE AND NEED FOR AGENCY ACTION

ES.2.1 Foresight's Purpose and Need

Most electricity produced in the U.S. comes from fossil fuels. However, in recent years, the majority of states in the southwestern U.S. have passed regulations or guidelines that require utilities to generate a specific percentage of their energy portfolio from renewable resources such as wind, solar, biomass, and geothermal. The State of Arizona adopted new Renewable Energy Standard and Tariff rules in 2006 requiring public utilities to provide 15 percent of their retail electricity from renewable energy sources by 2025.

Foresight's goal is to construct and operate a utility scale wind energy generating facility that is tied into the regional grid so that the energy produced can be marketed to utility companies in Arizona and other western states to help meet their State portfolio standards and energy requirements. Foresight's objectives include the following:

- To construct, own, operate, and maintain an efficient, economic, and reliable, utility scale wind generating facility that would help achieve State and/or regional renewable energy standards.
- To develop the wind energy generating facility on a site with an excellent wind resource.
- To interconnect to an electrical transmission system with available capacity that ties into the regional electric grid.
- To be consistent with the goals of the American Recovery and Reinvestment Act of 2009 that seeks to support home-grown renewable energy for economic recovery.
- To be consistent with Federal, Western Governors' Association, State, and local goals for clean renewable energy and sustainable economic development.

ES.2.2 Federal Agency Purpose and Need

Western Area Power Administration

Foresight has requested an interconnection with Western's electrical transmission system. Western is required to approve or deny the interconnection request in accordance with Western's Open Access Transmission Service Tariff (Tariff). Western's Tariff provides open access to its transmission system. If there is available capacity in the transmission system, Western provides transmission services through an interconnection. This interconnection request requires Federal action which triggers a review under the National Environmental Policy Act of 1969 (NEPA). The scope of the review for this Environmental Impact Statement (EIS) includes all proposed project components of the up to 500-megawatt (MW) wind project and related infrastructure.

U.S. Department of Agriculture, Forest Service, Coconino National Forest (Forest Service)

In addition to the request for interconnection, Foresight has applied to the Forest Service for a special use permit authorizing a 200-foot-wide right-of-way for a minimum period of 50 years to accommodate an electrical transmission tie-line on Forest Service-managed lands. Western would apply to the Forest Service for authorization to construct and operate an electrical switchyard if the interconnection request is approved. The Forest Service is authorized to issue special use permits under the Federal Land Policy and Management Act. Consideration of special use requests is based on direction contained in 36 Code of Federal Regulations (CFR) 251, Subpart B, including screening criteria that address consistency with policies and land management plans.

In order to provide an interconnection with Western's electrical transmission system, the switchyard and the transmission tie-line would be located on Forest Service-managed lands because the existing Western Glen Canyon-Pinnacle Peak 345-kV transmission lines are located on Forest Service-managed lands. The special use permits would authorize Foresight and Western to construct, operate, and maintain the transmission tie-line and switchyard on Forest Service-managed lands.

ES.3 PROPOSED ACTION AND ALTERNATIVES

ES.3.1 Federal Agency Proposed Actions

The proposed Federal actions evaluated in this EIS by each of the involved Federal agencies are as follows:

- **Western**: To approve Foresight's interconnection to Western's transmission system on the Glen Canyon-Pinnacle Peak 345-kV transmission lines, an action which would also require a new Western switchyard on Forest Service-managed lands.
- **Forest Service**: To approve Foresight's special use permit authorizing a 200-foot-wide right-of-way for a minimum period of 50 years to accommodate the construction, operation, and maintenance of a new 345-kV electrical transmission tie-line corridor across approximately 8.5 miles of Forest Service-managed lands. In addition, the Forest Service would authorize Western to construct, operate, and maintain a new switchyard on an approximately 15-acre parcel.

Western's preferred alternative is to approve Foresight's interconnection to Western's transmission system, including constructing the new switchyard to accommodate the interconnection. The Forest Service preferred alternative is Foresight's proposed project.

ES.3.2 Foresight's Proposed Project

Foresight proposes to construct and operate a utility scale wind energy generating facility on private and State trust land. The wind energy generating facility would generate up to 500 MW of electricity from wind turbine generators (WTGs).

The proposed project includes three main components: 1) a wind energy generating facility (wind park); 2) a 345-kV transmission tie-line (transmission tie-line); and 3) a 345-kV interconnection switchyard (switchyard) constructed, owned, and operated by Western.

Wind Park

The proposed wind park would be built in one or more phases, dependent on one or more power sale contracts. The proposed wind park would include improved and new access and service roads, WTGs, an electrical collection system, up to two step-up substations, communications system, operations and maintenance building, and meteorological monitoring towers. A preliminary layout plan is included in the Final EIS to depict potential location of these facilities for the project area for the up to 500 MW project as well as the initial and subsequent phases. Final (construction level) design and construction of all project infrastructure would be based on the following: 1) the estimated maximum disturbance and impact evaluations that are reflected in the Final EIS, including the preliminary layout plan provided in the Final EIS; and 2) micro-siting resource information from the pre-construction surveys. To the extent that pre-construction surveys provide information that minor adjustments in turbine siting or infrastructure would avoid or further reduce the impacts identified in the Final EIS, feasible adjustments would be made to further avoid or reduce impacts to resources.

Based on final design and micro-siting, all wind park facilities would be located within the wind park study area of the EIS and would not exceed the disturbance limits identified in the EIS. The study area for the wind park encompasses almost 100,000 acres of private and State trust lands and substantially exceeds lands anticipated to be disturbed for the various wind park facilities. Construction of the up to

500 MW wind park is expected to temporarily disturb 2,050 to 2,193 acres and permanently disturb 555 to 570 acres of land.

The number and model of WTGs are typically determined by one or more power sale contracts, the wind resource, and turbine availability and cost. The proposed wind park would generate electricity from WTGs rated at 1.5 to 3.0 MW. For purposes of this EIS, specifications for the Vestas V100 1.8-MW WTG are used to evaluate potential effects of the wind park. This 1.8-MW WTG is a tubular steel tower, 263 feet in height and 14 feet in maximum diameter. Three blades, each 161 feet in length, extend from the nacelle, located at the top of the tower; the turbine structure would be up to approximately 500 feet high when a blade is in the 12 o'clock position.

Engineering Surveys for the Wind Park

Geotechnical or geophysical investigations, soil resistivity and thermal conductivity tests, and a Worst-Case Fresnel Zone Study would be performed to aid in the final design of the wind park. A pre-construction engineering site survey would be performed to stake out the exact location of the WTGs, service roads, electrical collection system, access entryways from public roads, step-up substations, operations and maintenance building, and other project features prior to land disturbance.

Construction of the Wind Park

Construction activities would be temporary and would involve the use of heavy equipment including bulldozers, graders, trenching machines, concrete trucks, tractor-trailer trucks, and large cranes. Prior to beginning construction activities, the exact location of wind park facilities would be determined. The initial steps in the construction of the wind park would include constructing or improving access roads, developing a temporary power and water source, establishing borrow pits and setting up a rock crusher and batch plant, and establishing a project staging area. These activities would be followed by the construction of WTGs, the electrical collection system and communications system, the step-up substations, operations and maintenance building, and long-term meteorological towers.

Wind Park Primary Access and Service Roads

The primary site access road would be constructed for the initial project phase and originate from Meteor Crater Road and would extend to the west across Canyon Diablo and then south into the wind park study area across private and State trust lands. The access road would be approximately 16-feet wide and 8 miles in length. The roadway would be cleared of vegetation and excavated to a depth of up to 12 inches and covered with aggregate. The road surface would then be graded and compacted, and berms and other drainage features would be constructed as required.

The primary site access road would require a crossing of Canyon Diablo. This crossing would require a bridge-type structure with a span of up to 80 feet and a roadway of approximately 16 to 18 feet. Design and construction of the roads and crossing would be in accordance with Foresight's proposed Resource Protection Measures (RPMs) reflected in the Final EIS and Section 404 permit for the initial phase and subsequent phase(s) and compliance with County and other applicable road and crossing standards. These permits would be obtained prior to construction and based on final engineering design for the initial and subsequent phases.

In addition to the primary access road, Chavez Pass Road, an existing road located between Meteor Crater Road to the north and State Route 87 to the south, may also be used for site access for subsequent wind park phases. Chavez Pass Road is a primitive local road not maintained regularly by the County. Some improvements may be required, but it is anticipated the road would not need to be re-contoured or upgraded outside of the existing roadway.

Once primary access has been established, service roads to each WTG site and other wind park facilities would be constructed. Approximately 143 miles of service roads would be expected within the wind park study area if the project is fully built out to 500 MW. Service roads would be sited to minimize disturbance and maximize transportation efficiency. Existing roads, ranch roads, and two-track trails would be used to the extent possible. Service roads would generally be constructed to the same specifications and standards as the primary site access road, but would include a 10-foot shoulder on either side to accommodate a large crane. The wind park perimeter would not be fenced, and access to public land would not be gated. Primary access to the wind project on private land and trust lands administered by the ASLD would be via a newly constructed access road for which the ASLD anticipates issuing a non-exclusive right-of-way for the project, grazing lessees, and private landowners. Access to certain portions of the wind park on Federal, State, and private land may be restricted for public safety and project security.

Temporary Water and Power

Water would be required for construction activities during each project phase, including dust control and preparation of concrete. Water would be sourced from one or more privately owned wells located on private land within the wind park study area. Approximately 30 to 50 million gallons of water would be required for a 250 MW phase of construction, with 60 to 100 million gallons of total water required for full wind park build-out to 500 MW.

Potable water would also be sourced from within the wind park study area from a private landowner and would be available at the wind park staging area during construction.

There are currently no sources of electricity within the wind park study area. A temporary source of electricity would be required for construction. Two options are under consideration: 1) on-site generation, or 2) extending an electrical distribution line along Meteor Crater Road into the wind park study area across private and State trust lands.

Borrow Pits, Rock Crusher, and Batch Plant

Base material and aggregate required for construction activities including roads, staging areas, WTG foundations, transmission tie-line structure foundations, operations and maintenance building foundation, and up to two step-up substations are expected to be sourced from borrow pits located within the wind park study area on private land. One or more borrow pits would be used; each would be approximately two to four acres in size.

Materials quarried from each borrow pit would be processed through a portable rock crusher located at each borrow pit.

One or more portable concrete batch plants would be located within the wind park study area. Each batch plant would require an area approximately 0.1 acre in size, including an area for the batch plant and stockpiling of materials such as sand, cement, and water. Batch plants would be used to mix concrete for use in the WTG foundations, transmission tie-line structure foundations, and other facilities that would require the use of concrete.

Staging Areas for the Wind Park

Staging areas are typical of construction sites and are temporary use areas used to store and assemble materials, host office trailers and sanitation stations, and conduct safety meetings. A temporary wind park staging area would be developed on approximately 8 to 12 acres located within the wind park study area per project phase. An additional staging area, four to six acres in size, located within the wind park study area would be used during access road construction for equipment and employee parking. Staging areas would be prepared by clearing and grading as needed. The areas would then be leveled with four to six inches of gravel.

Construction of Wind Turbine Generators

The construction of each WTG would require an area approximately 2.2 acres in size, each of which would be located within the wind park study area on private and/or State trust lands. This area would be cleared with a grader and excavated with a backhoe to prepare for each concrete foundation and to accommodate the WTG, temporary work areas, and a crane pad.

The components of each WTG would arrive via semi-trailers. If one crane is used at the site, 10 to 13 semi-trailer loads of wind facility components would be transported and offloaded at the project site per equipment delivery day; if two cranes are used at the site, 20 to 26 trailer loads would be transported and offloaded per equipment delivery day.

WTG assembly would involve connecting the anchor bolts to the concrete foundation, erecting the tower and nacelle, assembling and erecting the rotor, connecting the internal cables, and inspecting and testing the electrical system prior to operation. WTG assembly would be completed using a large crane.

Construction of Electrical Collection System and Communications System

The electrical collection system and communications system would be co-located within the wind park study area adjacent to the WTG service roads to the extent possible. Up to approximately 241 miles of 34.5-kV collection lines and fiber optic cables are estimated if the project is built out to 500 MW. The majority of the lines would be underground. The underground lines would be constructed by excavating trenches to a minimum depth of four feet and a width of one to two feet. If utilized, the overhead lines would be supported by wooden poles approximately 25 to 30 feet tall and spaced approximately 150 feet apart. In addition to the fiber optic cables, the communication system may include a microwave tower to transmit data.

Construction of the Step-Up Substation and Operations and Maintenance Building

Up to two step-up substations would be constructed within the wind park study area, located on an approximately four-acre parcel with an additional two acres disturbed during construction activities. The expected location of the step-up substations and operations and maintenance building is depicted on the preliminary layout plan.

The electricity generated by the wind park would be gathered at the step-up substation where the voltage would be transformed from 34.5-kV to 345-kV. Construction would involve site grading, installing gravel material within the fenced area of the substation, constructing concrete foundations for the transformers and other components within the substation, installing substation equipment, and erecting a chain-link fence around the substation perimeter for public safety and project security.

The operations and maintenance facility would be constructed within the wind park study area on private or State trust land, located on an approximately 2.1-acre parcel. Construction of the facility would include foundation preparation and pouring, framing the structure and roof trusses, installing the outer siding, installing plumbing and electrical work, and finishing the interior carpentry. Once complete, the facility would have the appearance of a typical prefabricated steel building.

Meteorological Towers

Several temporary meteorological (met) towers have been constructed over the past several years to gather wind data indicating the feasibility of the wind park. These existing towers would remain in place until construction of the wind park is complete. In addition, up to five additional temporary met towers could be installed prior to construction to further analyze the wind resource across the wind park study area. Temporary towers would be decommissioned and removed during the construction process for wind park phases. Up to 12 long-term or permanent met towers would be used to monitor wind conditions at the site if the wind park is built out to 500 MW. These met towers would be free-standing structures, approximately 263 feet tall, and constructed of steel lattice. The permanent towers would be connected to the facility's central Supervisory Control and Data Acquisition (SCADA) system. These towers would be lighted according to Federal Aviation Administration (FAA) requirements for structures over 200 feet, similar to the WTGs.

<u>Operation and Maintenance of the Wind Park</u>

Wind Park Start-Up

Plant commissioning would follow mechanical completion of the wind park, transmission tie-line, and switchyard and would begin with a detailed plan for testing and energizing the electrical collection system, step-up substations, transmission tie-line, and interconnection switchyard in a defined sequence with lock and tags on breakers to ensure safety and allow for fault detection prior to energizing any component of the system. Once the step-up substation is energized, feeder lines would be brought on line. Individual turbines would then be tested extensively and brought on line, one by one.

Wind Park Operating Requirements and Staffing

The wind park would be designed to be in operation 24 hours per day, 365 days per year. The wind park would be staffed as necessary to provide operational maintenance and environmental compliance support during core operating hours. The wind park's central SCADA system would stay online 24 hours per day, 365 days per year. Operational modifications could be implemented as part of the adaptive management plan of an Avian and Bat Protection Plan in coordination with U.S. Fish and Wildlife Service (USFWS) and Arizona Game and Fish Department (AGFD).

Fencing and Security

The wind park perimeter would not be fenced, and access to public land would not be gated. Access to certain portions of the wind park might be limited for public safety and project security in consultation with ASLD and the Forest Service. Wind park service roads that do not access public lands might be gated. A lockable steel door at the base of each WTG would restrict access to authorized personnel only. If the selected WTG requires a pad-mount transformer, these would be locked. The step-up substations would be fenced and gated and access would be limited to authorized personnel. Access to the operations and maintenance facility, met towers, and communications tower would be limited to authorized personnel.

Wind Park Power

During the operating life of the wind park, electricity for the operations and maintenance facility would be needed. Once Western's interconnection switchyard and the wind park's transmission tie-line and step-up substation are complete and energized, station power to the wind park facilities would be fed via a dedicated circuit from the step-up substation.

Operation of the Communication System

Each turbine would be connected to the SCADA system. The SCADA system would allow for remote control and monitoring of individual turbines and the wind park as a whole from either the central host computer or from a remote computer. Any abnormalities or emergencies detected by the system would initiate a callout sequence, and a maintenance person would be alerted and, if required, dispatched to the WTG immediately to implement corrective action.

Operation of the WTGs

The wind turbines would be equipped with sophisticated computer control systems to monitor variables such as wind speed and direction, air and machine temperatures, electrical voltages, currents, vibrations, blade pitch and yaw angles, etc. The main functions of the control system would include nacelle and power operations. Aerodynamic brakes and mechanical disk brakes would be installed as security measures in each WTG. The braking system is designed to be fail-safe, allowing the rotor to shut down during high wind conditions or in less than five seconds in case of electric power failure. Emergency stops would be located in the nacelle and in the bottom of the tower.

Typical chemicals would be used during operation and maintenance of WTGs, including anti-freeze liquid to prevent freezing, gear oil for lubricating the gearbox, hydraulic oil to pitch the blades and operate the brake, grease to lubricate bearings, and various cleaning agents and chemicals for maintenance of the turbine.

WTGs would be lighted according to FAA requirements for structures over 200 feet and, if approved, the FAA would issue a Notice of Determination of No Hazard to Air Navigation per structure. The FAA would provide an approved lighting plan for perimeter WTGs and select internal WTGs for the final project layout, per phase, prior to construction. Typically the FAA requires that approximately one-third of all WTGs in a wind park are lighted. Industry standard lighting is a medium intensity red synchronized flashing light-emitting diode (LED) obstruction light with a horizontal beam pattern.

Operations and Maintenance Building

The operations and maintenance facility would be located within the wind park study area on private land or State trust land and would include a main building with an employee work area, spare parts storage, restrooms, a shop area, outdoor parking facilities, a turn-around area for larger vehicles, and outdoor lighting. The facility is expected to be fenced and access would be limited to authorized personnel. During operations and maintenance, water to the facility would be provided by either an existing well or a new well. Domestic sewage would be treated through a closed septic system. The septic system would be leach field design, typical to the region and permitted through Coconino County. Facility exterior lighting would be in conformance with the Coconino County Lighting Ordinance.

Transmission and Extension Tie-lines

The electricity generated by the wind park would be gathered at the step-up substations located within the wind park where the voltage would be transformed from 34.5-kV to 345-kV. A new 345-kV single-circuit electrical transmission tie-line would be constructed between the initial wind park step-up substation and Western's existing Glen Canyon-Pinnacle Peak No. 1 and No. 2 345-kV transmission lines. The transmission tie-line would be approximately 15 miles in length, extending 8.5 miles across Forest Service-managed lands and up to approximately 6.5 miles across State trust and private lands. The Glen Canyon-Pinnacle Peak 345-kV transmission lines are part of the regional electrical grid. Connecting into this existing electrical transmission system would allow electricity produced at the wind park to be sold and used by Arizona and regional utilities.

The transmission tie-line would include monopole structures, conductors (power lines), and associated access roads. Structures are expected to be neutral light-grey or off-white steel structures with non-reflective finishes and would be approximately 120 feet in height and spaced approximately every 1,000 feet. Approximately 80 steel monopole structures would be erected. A minimum 50-year right-of-way from the Forest Service and ASLD, 200 feet in width, would be acquired for construction, operation, access, and maintenance. Details of the right-of-way lease and duration would be discussed with landowners prior to final design. Construction of the transmission tie-line is expected to temporarily disturb 345 to 413 acres and permanently disturb 19 to 25 acres of land.

An extension tie-line approximately seven miles in length, ranging between 138-kV and 230-kV, would connect the two step-up substations within the wind park. Pole structures for the extension tie-line would be 100 to 180 feet in height.

Engineering Surveys for the Transmission and Extension Tie-lines

Pre-construction engineering surveys would be conducted to locate the transmission and extension tie-line rights-of-way, to identify property boundaries, to provide accurate ground profiles along the transmission and extension tie-line centerlines, to locate existing structures, and to determine the locations and rough ground profiles for new service roads. Soils would be tested to determine physical properties, including the ability to support the proposed structures.

Construction of the Transmission and Extension Tie-lines

Transmission and Extension Tie-lines Mobilization and Staging

Up to three staging areas are planned for the construction of the transmission tie-line with one located near the switchyard (on Forest Service-managed lands) and one located within the wind park study area near the step-up substation (on private or State trust land). The staging area near the step-up substation would also be used for the extension tie-line. A third staging area would be located at a central point along the transmission tie-line route (on Forest Service-managed lands). Each staging area would be approximately four acres in size, located adjacent to the tie-line route. Staging areas would be sited to minimize land disturbance for the transmission tie-line construction.

Construction of Transmission and Extension Tie-line Access Roads

Primary construction and maintenance access to the transmission tie-line would be from either Lake Mary Road to Forest Service Route (FS) 125 or from the wind park through the primary site access road. Construction access to the extension tie-line would be from the primary site access road. Access to each structure location would be required. In order to minimize ground disturbance, existing roads would be used when possible with new spur roads constructed to the structure sites. When existing roads are distant from the transmission tie-line, a new access road or spur-road would be established adjacent to the transmission tie-line within the right-of-way. Typically the roads would be between 12 and 16 feet in width with a surface that is bladed, compacted, and lightly graveled.

Construction of Transmission and Extension Tie-lines and Temporary Use Areas

A right-of-way, 200 feet in width and extending the length of the tie-line, would be required. The right-of-way would extend 100 feet to either side of the transmission tie-line structures. An authorization, which would include use of existing and newly constructed roadways outside of the right-of-way, would be obtained from the Forest Service and ASLD. If additional areas are needed, they would be identified, discussed with the appropriate landowner, and all necessary environmental clearances would be performed. All land rights would be acquired in accordance with applicable laws and regulations governing acquisition of property rights.

Structure Installation

Each structure location would be determined and access to the site would be constructed as necessary. Structures would generally be spaced 1,000 feet apart; however this distance may vary depending on topography. A foundation would be prepared at each structure site. Each foundation would be excavated using a power auger or drill. Once the hole is bored, a reinforcing steel cage would be inserted and then the hole would be filled with concrete to form the foundation. Sections of the new structures and associated hardware would then be delivered to each structure site by flatbed truck. Erection crews would use a large crane to position the base section. The base would be secured to the concrete foundation. The remaining sections of the structure would be lifted into place by the crane and secured.

Installation of Conductors, Insulators, Hardware, and Shield Wires

The conductor is the wire cable strung between the structures on the transmission tie-line through which the electric current flows. Once all the structures have been erected, the conductor would be put in place through a process known as "stringing." Pulling and tensioning sites to conduct this stringing would be located at each end of the transmission tie-line alignment and at turning structures.

<u>Operation and Maintenance of the Transmission and Extension Tie-lines</u>

The transmission and extension tie-lines would be operated from a remote power control center. Although the proposed transmission tie-line system would operate at 345-kV, the amount of power transferred along the conductors would vary depending on seasonal and time-of-day loads, as well as other system demands. The proposed transmission system would be maintained by monitoring, testing, and repairing equipment.

Western's Switchyard

Western's proposed 345-kV interconnection switchyard would be constructed on an approximately 15-acre parcel entirely on Forest Service-managed lands, located about three-quarter mile north of FS 125 and generally within the existing rights-of-way of Western's two 345-kV transmission lines. The switchyard is expected to be approximately 650 feet wide by 1,000 feet long. The switchyard for this project would contain power circuit breakers, disconnect switches, steel busses, steel poles, cables, metering equipment, communication equipment, AC/DC batteries, and other equipment. The switchyard facilities would be constructed, owned, and operated by Western through an agreement with the Forest Service.

Pre-construction aerial and/or ground engineering surveys would locate the switchyard property lines and corners, provide accurate ground profiles, locate structures, and determine the exact locations and rough ground profiles for new access roads.

The 345-kV switchyard would temporarily require approximately 24 acres during construction and would permanently disturb about 15 acres. Construction vehicles and equipment that would be needed for the construction of the switchyard include large cranes, heavy backhoes and earthmovers, large forklifts, and various power tools. Construction of the switchyard and interconnection facilities would involve several stages of work including access road construction and/or improvement; grading of the switchyard area; and construction of foundations for transformers, steel work, breakers, control houses, and other outdoor equipment.

A temporary staging area would be developed on approximately three to four acres adjacent to the switchyard site. The staging area would be used for construction safety meetings, to host office trailers, temporary sanitation stations, parking for equipment, vehicle parking for equipment operators and construction workers, and staging for limited project components. The staging area would be prepared by clearing and grading as needed. The area would then be covered with four to six inches of gravel to provide a level ground surface.

Primary construction and maintenance access to the switchyard site would come from Lake Mary Road to FS 125. From FS 125, the switchyard would be accessed via Western's current easement. An existing access road within this easement would be improved to allow movement of construction vehicles. Improvements of Western's access road would involve vegetation clearing, excavating current groundcover to a depth of up to 12 inches, and covering the surface with approximately 4 to 6 inches of aggregate from off-site sources or the borrow pits located in the wind park study area.

Western requires dual and redundant communication with its switchyards. A microwave communication tower would be installed within the new switchyard to deliver signals to operate switchyard equipment from control centers and other remote locations and to report metering. A microwave communication tower approximately 60 feet high would be constructed at the switchyard with a microwave antenna aimed toward an existing communication link on Mount Elden approximately 25 miles northwest of the proposed switchyard site.

Western would install four new in-lead dead-end structures to provide a tie with the new switchyard and the existing Glen Canyon-Pinnacle Peak transmission lines. Each dead-end structure would be a heavy-duty, galvanized steel monopole structure and provide a tie into the new switchyard. It is envisioned that the new structures would be located within the existing Glen Canyon-Pinnacle Peak transmission lines rights-of-way.

Switchyard start-up would follow a detailed plan for testing and energizing the step-up substation, transmission tie-line, and interconnection switchyard in a defined sequence with lock and tags on breakers to ensure safety and allow for fault detection prior to energizing any component of the system. Switchyard start-up would not require any heavy machinery to complete.

During operation of the new switchyard, authorized Western personnel would conduct periodic inspections and service equipment as needed. Properly trained maintenance personnel would monitor and manage the use, storage, and replacement of gas-filled breakers to minimize any releases to the environment. During inspections, equipment would be monitored for detection of leaks and repairs would be made as appropriate. The switchyard would be designed to operate from a remote location, and no permanent employees would be required.

ES.3.3 Alternative Transmission Tie-line Corridor

Foresight, in coordination with the Forest Service, has proposed a route for the transmission tie-line to address potential effects to visual resources and avoid or minimize impacts to other resources. The alternative tie-line would deviate from Foresight's proposed tie-line route by approximately one-half mile to avoid the intersection of FS 125 and FS 82 on Forest Service-managed lands. The wind park and interconnection switchyard would be located in the same location and constructed in the same manner as described at Section ES.3.2.

Similar to Foresight's proposed transmission tie-line, the alternative transmission tie-line would require approximately 80 structures and would be approximately 15 miles long, extending 8.5 miles across Forest Service-managed lands and 6.5 miles across State trust and private lands. The alternative action would result in slightly more ground disturbance than the transmission tie-line associated with Foresight's proposed transmission tie-line because it uses fewer existing roads. Ground disturbance for the alternative action is estimated to be 346 to 414 acres of temporary disturbance (approximately one acre more than Foresight's proposed transmission tie-line) and 20 to 26 acres of permanent disturbance (approximately one acre more than Foresight's proposed transmission tie-line).

ES.3.4 No Action Alternative

Under the No Action Alternative, Western would deny the interconnection request and the Forest Service would not permit facilities to be placed on Forest Service-managed lands. For the purpose of impact analysis and comparison in this EIS, it assumed that the proposed wind park would not be built and the environmental impacts, both positive and negative, associated with construction and operation would not occur.

ES.3.5 Alternatives Considered but Eliminated from Consideration

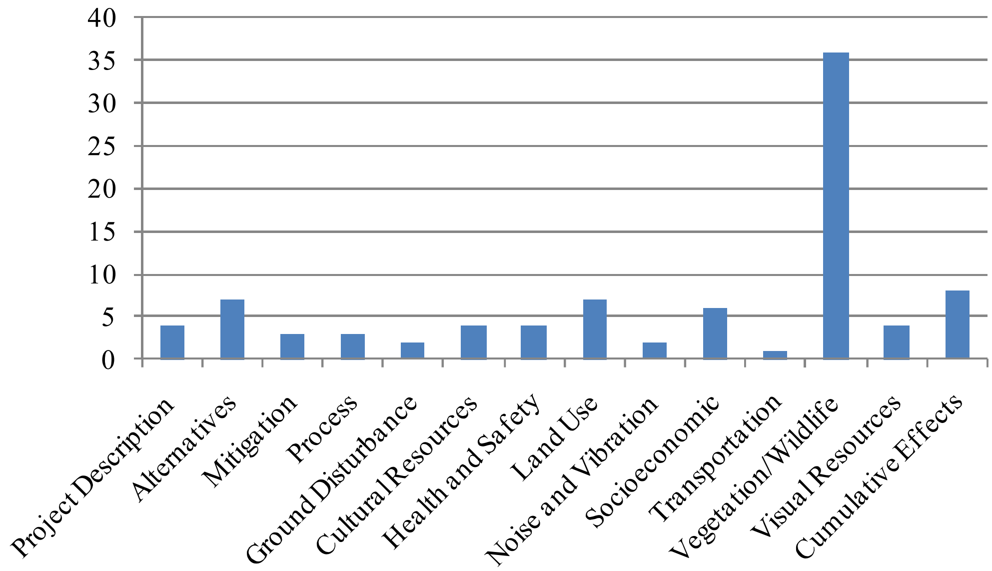
Five alternatives to the location of the proposed transmission tie-line and switchyard were considered during scoping. Additionally, an alternative addressing burying the transmission tie-line was considered. None of the transmission tie-line alternatives were carried forward for consideration based on criteria including cost, construction feasibility, environmental resource sensitivities, and conformance with applicable land use plans. Western considered the alternative wind park locations suggested during the public comment period and determined that the EIS will not fully analyze them because Western's authority is whether to interconnect Foresight's proposed wind park.

ES.4 PUBLIC INVOLVEMENT, CONSULTATION, AND COORDINATION

Interested parties were notified of the proposed project and the public comment opportunity through a Notice of Intent (NOI) published in the Federal Register on July 24, 2009 (Vol. 74, No. 141, page 36689). The NOI announced the scoping meetings held in Mormon Lake and Flagstaff, Arizona and the deadline for submitting comments as August 28, 2009. It included a description of proposed facilities, project location, how to submit comments and why they are important, and how to contact the lead agency. A packet of similar information was mailed directly to nearly 400 members of the public on July 20, 2009. A press release, radio announcements, flyers, newspaper advertisements, an e-mail notice, and Western's website provided additional notice and instruction for submitting comments beginning July 22, 2009.

A total of 27 parties submitted 91 specific comments. The issues, concerns, questions, and opportunities that were identified have shaped development of the EIS. A summary of the issues of concern to participants is depicted in Figure ES.4-1.

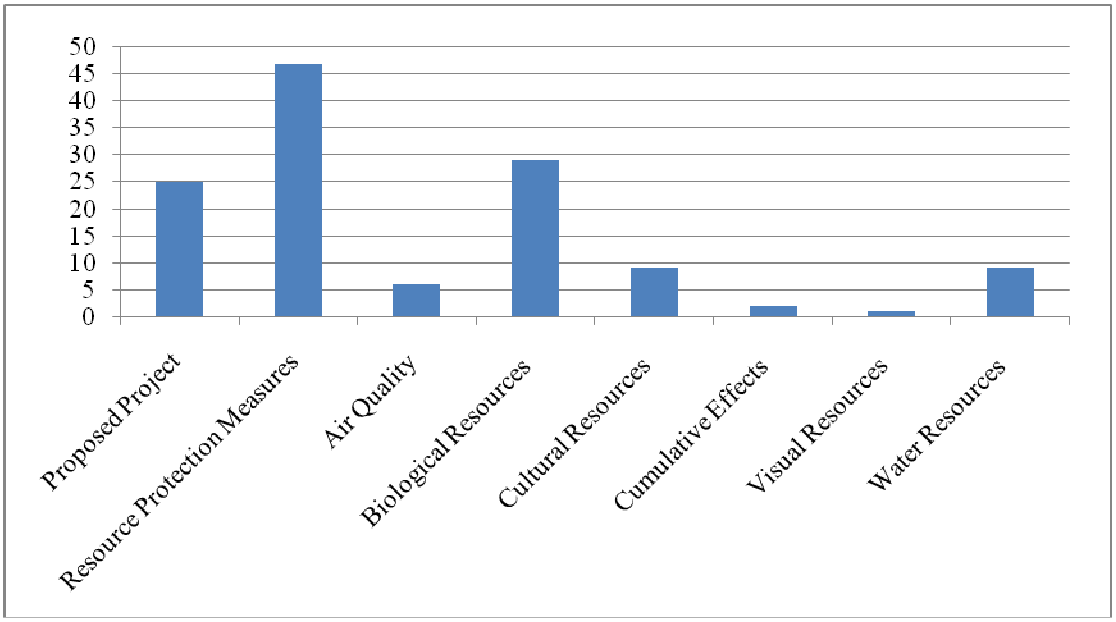
FIGURE ES.4-1
SUMMARY OF SCOPING COMMENTS RECEIVED



The Draft EIS was issued in July 2010. The U.S. Environmental Protection Agency (EPA) published a Notice of Availability (NOA) in the Federal Register on July 23, 2010 (Vol. 75, No. 141, page 43161). The NOA also announced a 45-day comment period for receipt of comments on the Draft EIS. Locally, Western published a display ad and Coconino National Forest (Forest) published a legal notice in the Arizona Daily Sun with the NOA information and announcements of two public hearings held in Mormon Lake and Flagstaff. Western also provided notification of the issuance of the Draft EIS and the hearings to entities with email addresses.

Western provided compact discs and/or hard copies of the Draft EIS to 108 agencies, Tribes, organizations, and individuals. Copies of the Draft EIS were available at the Forest Supervisor's Office in Flagstaff, the Flagstaff and Winslow Public Libraries, and Western's Desert Southwest Regional Office in Phoenix, Arizona. The Draft EIS was also posted on Western and Forest websites. In response, Western received 18 comment documents as of September 13, 2010 from which it identified 126 substantive comments related to the proposed project, RPMs, and biological resources, including avian and bat protection (Figure ES.4-2). Many comments resulted in changes to the Draft EIS in terms of factual content or analysis.

FIGURE ES.4-2
SUMMARY OF PUBLIC COMMENTS RECEIVED



Western initiated consultation with tribal governments by letter in October of 2009. Tribes responding to the request for participation included the Hopi, Zuni, White Mountain Apache, and Tonto Apache tribes and the Navajo Nation. Tribes provided assistance in evaluating Traditional Cultural Properties (TCPs), conducting cultural resource surveys, and developing ethnographic studies. The Zuni Historic Preservation Office produced a report titled *Zuni Traditional Cultural Property Assessment and Cultural Issues Associated with the Proposed Wind Project, Coconino County, Arizona* and submitted the report to Western in June 2010. Consultation efforts will continue into the construction stages of the proposed project.

A Programmatic Agreement (PA) was prepared by Western and executed by Western, the Forest Service, Arizona State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation. In addition, Foresight and Tonto Apache Tribe signed as concurring parties. The PA establishes the area of potential effect for the proposed project, describes the Class III survey methodology to be used prior to final engineering design, proposes a treatment plan for identified resources that cannot be avoided, describes procedures for unanticipated discoveries, sets forth procedures for tribal consultation, and suggests general mitigation measures.

ES.5 SUMMARY OF RESOURCE PROTECTION MEASURES AND POTENTIAL IMPACTS

Construction, operation, and maintenance of the proposed project would have certain impacts, both beneficial and adverse.

Foresight and agencies have proposed RPMs for each resource area to minimize impacts associated with construction, operation, and maintenance. Foresight and agencies have committed to these RPMs, and they are included in the evaluation of environmental impacts. Foresight would follow standard construction practices, Best Management Practices (BMPs), and RPMs during the construction, operation, and maintenance of the proposed wind park and transmission tie-line facilities. Some RPMs have been designed to address the direct and indirect impacts to birds and bats during construction and operation based on additional impact assessments and data acquired during actual construction and operation. To implement the RPMs, an Avian and Bat Protection Plan (ABPP) is being voluntarily developed with USFWS and AGFD. The ABPP includes components such as additional pre-construction and post-construction wildlife studies to inform final micro-siting of the initial project phase and monitor operational impact levels that are based on the Wind Turbine Guidelines Advisory Committee (WTAC) Tier 4 framework (USFWS 2010). An Adaptive Management protocol would be implemented within the ABPP whereby iterative decision-making (evaluating results and adjusting actions on the basis of what has been learned) would be undertaken to reduce or avoid impacts to biological resources if post-construction monitoring demonstrates that impacts are greater than anticipated.

Western and the Forest Service do not have jurisdiction over the siting, construction, or operation of the proposed wind park, so their proposed RPMs apply to the proposed switchyard (Western) and the proposed switchyard and transmission tie-line (Forest Service). The Forest Service has proposed certain measures that would be binding on Foresight for the proposed transmission tie-line and on Western for its proposed switchyard, if adopted by the Forest Service. In addition, Western requires its construction contractors to implement standard environmental protection provisions. These provisions are provided in Western's Construction Standard 13 (Appendix A.1) and would be applied to the proposed switchyard. Specific BMPs that the Forest would require address soil and water resources and invasive species management for the proposed transmission tie-line and switchyard.

Western, the Forest Service, and Foresight are among the signatories to the PA and are required to comply with the National Historic Preservation Act and thus would abide by the provisions in the PA addressing effects to properties on or eligible for listing to the National Register of Historic Places (NRHP).

Table ES.5-1 summarizes the environmental resources components evaluated and the environmental impacts of the proposed project, alternative transmission tie-line, and no action alternative.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard	No Action Alternative
Land Use	Development of the up to 500 MW wind project would result in a permanent conversion of 591–627 acres of land from grazing to other use. Approximately 97 percent of the wind park site area would remain available for grazing per phase.	Development of the up to 500 MW wind project would result in a permanent conversion of 592–628 acres of land from grazing to other use, slightly more than under the proposed wind park, tie-line, and Western's proposed switchyard. Impacts would not be noticeably different than those described under the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would result in no change to existing land uses.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard	No Action Alternative
Biological Resources	Construction of the wind park is expected to temporarily disturb 2,050–2,193 acres and permanently disturb 555–570 acres of scrub-shrub, grassland, and a small amount (less than 2 percent) of evergreen forest. Construction of the transmission tie-line and switchyard is expected to temporarily disturb 345–413 acres and permanently disturb 19–25 acres of grassland, pinyon-juniper woodland, and a small amount (less than 3 percent) of ponderosa pine forest. Landcover types and habitats found within the wind park study area and adjacent to the transmission tie-line and switchyard are not unique to the surrounding landscape or region.	Construction of the wind park is expected to temporarily disturb 2,050–2,193 acres and permanently disturb 555–570 acres of scrub-shrub, grassland, and a small amount (less than 2 percent) of evergreen forest. Construction of the alternative tie-line and switchyard is expected to temporarily disturb 346–414 acres (approximately 1 acre more than Foresight's proposed transmission tie-line alignment) and 20–26 acres of permanent disturbance (less than 1 acre more than Foresight's proposed tie-line alignment). The alternative tie-line route would affect open grassland. Impacts to special status species; birds, raptors, and bats; and big game would not be noticeably different than those under the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect to biological resources.

TABLE ES.5-1 COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES			
Resource	**Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard**	**Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard**	**No Action Alternative**
Biological Resources (continued)	Special status plant species have highly restricted distributions and very specific habitat requirements and are not expected to occur within the wind park study area based on either an absence of habitat, range, or distribution. Canyon bottoms containing riparian areas, deciduous woodlands, wetlands, or waterbodies may support wetland and mesic plant species would be mostly avoided by wind park facilities. Federally-listed Mexican spotted owls are known to occur in the Forest in the vicinity of the transmission tie-line, and while the species move through the area, suitable nesting habitat is not present within or immediately adjacent to the proposed transmission tie-line evaluation area. The USFWS provided comments to the Draft EIS stating that the Federally-listed Mexican gartersnake and Chricahua leopard frog are not believed to occur or be affected by the project. Implementation of these RPMs during construction and operation of the wind park facilities would minimize impacts to these species. Construction and operation of the proposed project may result in direct impacts to the birds, raptors, and bats through collision and/or electrocution with the wind turbines and power lines. RPMs include additional pre-construction surveys, preparation of an ABPP, constructing outside of bird nesting season or nest area avoidance, adherence to the Avian Power Line Interaction Committee suggested practices for avian protection on power lines, and formal post-construction monitoring study designed to estimate and address avian and bat mortality.		

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard	No Action Alternative
Biological Resources (continued)	Construction activities may cause short-term impacts to big game such as antelope, mule deer, and elk populations. Big game behavior and movement throughout the area of potential disturbance may be affected, but operation of project facilities is not expected to have long-term impacts on big game behavior or movement patterns. Population trends and habitat viability associated with these species would not be impacted by construction and operation of the wind park, transmission tie-line, and switchyard.		
Cultural Resources	Would directly disturb between 2,419–2,630 acres of land within areas known to have been used prehistorically and historically. Research identified 678 previously recorded cultural resources within the cultural resources evaluation area for the proposed project facilities. Twenty-four of the sites potentially occur within 100 feet of the wind park study area, transmission tie-line, and/or switchyard. Of the 24 sites identified during the background research, 4 of these are recommended as eligible for listing on the NRHP. The preliminary layout plan for the primary access road was prepared to avoid impact to these sites. Western would consult with the signatories to the PA to determine the NRHP eligibility for 12 newly recorded sites and seven rock cairns based on the Class III pedestrian surveys completed for the proposed project. Of the 12 newly recorded sites, 9 are associated with the proposed transmission tie-line and 3 sites and rock cairns are associated with the proposed primary site access road. The preliminary layout plan for the proposed access road was prepared to avoid impacts to those sites and rock cairns.	Would directly disturb between 2,420–2,631 acres of land within areas known to have been used prehistorically and historically, slightly more than the proposed wind park, transmission tie-line, and Western's proposed switchyard. Impacts would not be noticeably different than those under the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on cultural resources.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard	No Action Alternative
Cultural Resources (continued)	The development of wind park and transmission tie-line facilities may also indirectly impact areas of interest to Native Americans such as sacred areas, or areas used for collecting traditional resources such as birds and medicinal plants. Visual impacts on significant cultural resources such as sacred landscapes, historic trails, and viewsheds from other types of historic properties (e.g., homes and bridges) may also occur. In addition, there may be visual impacts on TCPs because the visible wind turbines may be perceived as an intrusion on a sacred or historic landscape that could result in a significant adverse effect to these TCPs.		
Geology and Soils	Would temporarily disturb between 2,419–2,630 acres of land and would permanently remove vegetation from and alter the surface of 591–627 acres of land. This would result in increased erosion and the permanent loss of soils.	Would temporarily disturb between 2,420–2,631 acres of land and would permanently remove vegetation from and alter the surface of 592–628 acres of land. Impacts would be slightly greater than those described under the proposed wind park, transmission tie-line, and Western's proposed switchyard because the transmission tie-line associated with the alternative action requires a new access road across moderately erosive soils that are difficult to revegetate.	Would have no effect on geology and soils.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard	No Action Alternative
Air Quality	Air quality impacts would be minimal, generally resulting from emissions and fugitive dust from equipment and vehicle operations during construction. Air quality impacts would be greatest during the construction period with fugitive dust emissions primarily from earthmoving, construction vehicle exhaust emission, and fugitive and point sources associated with the concrete batch plant. Operational impacts would be minimal because WTGs do not have emissions. There are emissions and dust associated with maintenance vehicle traffic. RPMs have been identified to further reduce the effects to air quality and there would be no measurable impact.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on air quality.
Water Resources	Construction would require approximately 307 acre-feet of groundwater if the wind park is built out to 500 MW. Operations would require a negligible amount of water. Soil erosion and sedimentation would increase as a result of the temporary disturbance of between 2,419–2,630 acres of land as would the permanent disturbance and removal of vegetation from 591–627 acres of land. Potential impacts to waters of the U.S. or wetlands identified by the Forest Service could result from construction, operation, and maintenance of the proposed wind park and transmission tie-line. Potential impacts include placement of fill or removal of materials and vegetation; altered flows or sediment transport; spills of contaminating materials; increased scour and erosion downstream; and construction of diversions, culverts, and below grade utility structures.	Construction and operations would require the same amount of water as the proposed wind park, transmission tie-line, and Western's proposed switchyard. Between 2,420–2,631 acres of land would be disturbed temporarily and 592–628 acres of land would be permanently disturbed resulting in erosion and sedimentation. Impacts to preliminary jurisdictional washes would not be noticeably different than those described under the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on water resources.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard	No Action Alternative
Water Resources (continued)	Approximately 262 miles of potential jurisdictional waters have been observed in the up to 500 MW wind project study area. The impact of the initial phase is expected to affect approximately one-half acre for the initial phase study area, subject to USACE determination. Preliminarily, a similar impact for the build-out phase(s) study area in anticipated, also subject to USACE determination. It is expected through avoidance of features identified as jurisdictional waters of the U.S. to the extent practicable and through implementation of RPMs and other best management practices, to reduce impacts to jurisdictional features to the least environmentally damaging approach that can be achieved as required through the Clean Water Act Section 404 permitting process.		
Socioeconomics	Would result in the employment of approximately 400 workers directly, or through local or regional construction and service contract firms, during construction and between 17–40 workers during regular operations for a typical 500 MW wind park. This would lead to a slightly greater demand on public facilities, including schools. Vacancy rates in housing units in the region suggest capacity is available for this level of employment. In addition, the project would create a supplemental source of revenue to ranchers and State trust land beneficiaries and provide new tax revenues to the County and State.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would not realize the economic objectives of the Diablo Canyon Rural Planning Area since no similar economic development proposals are currently under consideration.
Environmental Justice	Would result in additional employment opportunities and tax revenue that would benefit directly or indirectly persons living below the Federal poverty level.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on environmental justice, beneficial or otherwise.

TABLE ES.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard	Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard	No Action Alternative
Transportation	Would result in a short-term (12–18 months per wind park phase) increase in construction related traffic of over 400 two-way vehicle trips each day during peak construction activity on I-40 and Meteor Crater Road and approximately 25 two-way vehicle trips each day on Lake Mary Road and FS 125. It would result in a minimal long-term increase in vehicular traffic on I-40 and Meteor Crater Road. Impacts would be proportionally reduced for project phases.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard. Impacts would be proportionally reduced for project phases.	Would have no effect on transportation.
Health, Safety, and Security	Would create minimal occupational hazards, public safety, and environmental hazards during construction and operations.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on health and safety.
Noise	Construction equipment would elevate ambient noise levels substantially over the short-term (12–18 months per wind park phase) during certain construction activities, but operations would result in a minimal increase in ambient noise levels that would dissipate over a short distance.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on noise.
Visual Resources	Would result in a visual contrast by introducing contrasting elements of form, line, and color. In addition, the proposed transmission tie-line would result in a Visual Quality Objective of Modification within an area on Forest System-managed lands for a Visual Quality Objective of Partial Retention.	Effects would generally be the same as those described under proposed wind park, transmission tie-line, and Western's proposed switchyard except the tie-line would be routed to avoid the more sensitive area (Partial Retention) on Forest System-managed lands.	Would have no effect on visual resources.

CHAPTER 1: PURPOSE AND NEED

1.1 INTRODUCTION

This Final Environmental Impact Statement (EIS) has been prepared to analyze the potential environmental consequences related to a wind energy generating facility's interconnection with Western Area Power Administration's (Western) electrical transmission system and the U.S. Department of Agriculture, Forest Service (Forest Service), Coconino National Forest's (the Forest) authorization of a special use permit to construct and operate an electrical transmission tie-line and switchyard on Federal land to support the wind energy generating facility.

Foresight Flying M, LLC (Foresight) proposes the development of the Grapevine Canyon Wind Project in Coconino County, near Flagstaff, Arizona (Figure 1.1-1). The project would be located on Federal, State trust, and private land and would include three main components: 1) a wind energy generating facility up to 500 megawatts (MW); 2) a 345-kilovolt (kV) electrical transmission tie-line; and 3) a 345-kV electrical interconnection switchyard with facilities that would be owned and operated by Western. The wind generation component would be constructed on private land and State trust land administered by the Arizona State Land Department (ASLD). The electrical transmission tie-line and interconnection switchyard would be located on lands administered by the Forest Service. Construction is expected to begin in 2012. The wind energy generating facility may be built in two or more phases over a period of years with an initial construction schedule for the first phase between 12–18 months.

Foresight has applied to Western to interconnect the proposed wind energy generating facility to Western's power transmission system on its Glen Canyon-Pinnacle Peak 345-kV No. 1 and No. 2 transmission tie-lines. Western would construct the 345-kV interconnection switchyard within an area adjacent to the Glen Canyon-Pinnacle Peak transmission tie-lines.

Additionally, Foresight has applied to the Forest Service for a special use permit authorizing a 200-foot-wide right-of-way to accommodate the construction and operation of a new 345-kV electrical transmission tie-line. In addition, Western would apply to the Forest Service for authorization to construct and operate the proposed switchyard if the interconnection request is approved.

The project requires an environmental review under the National Environmental Policy Act (NEPA), because the permitting of the transmission tie-line and construction and operation of an electrical switchyard on Federal land under the jurisdiction of the Forest Service is a Federal action. In addition, the project requires the preparation of an EIS because of Western's interconnection requirements. Western is the lead Federal agency for this project, and the Forest Service and ASLD are cooperating agencies. The scope of the review for this EIS includes all proposed project components of the up to 500 MW wind project and related infrastructure.

1.2 PURPOSE AND NEED

1.2.1 Foresight's Purpose and Need

Nearly three-quarters of electricity produced in the United States comes from fossil fuels (Figure 1.2-1). However, in recent years, the majority of states in the southwest have passed regulations or guidelines that require utilities to generate a specific percentage of their energy portfolio from renewable resources such as wind, solar, biomass, and geothermal.

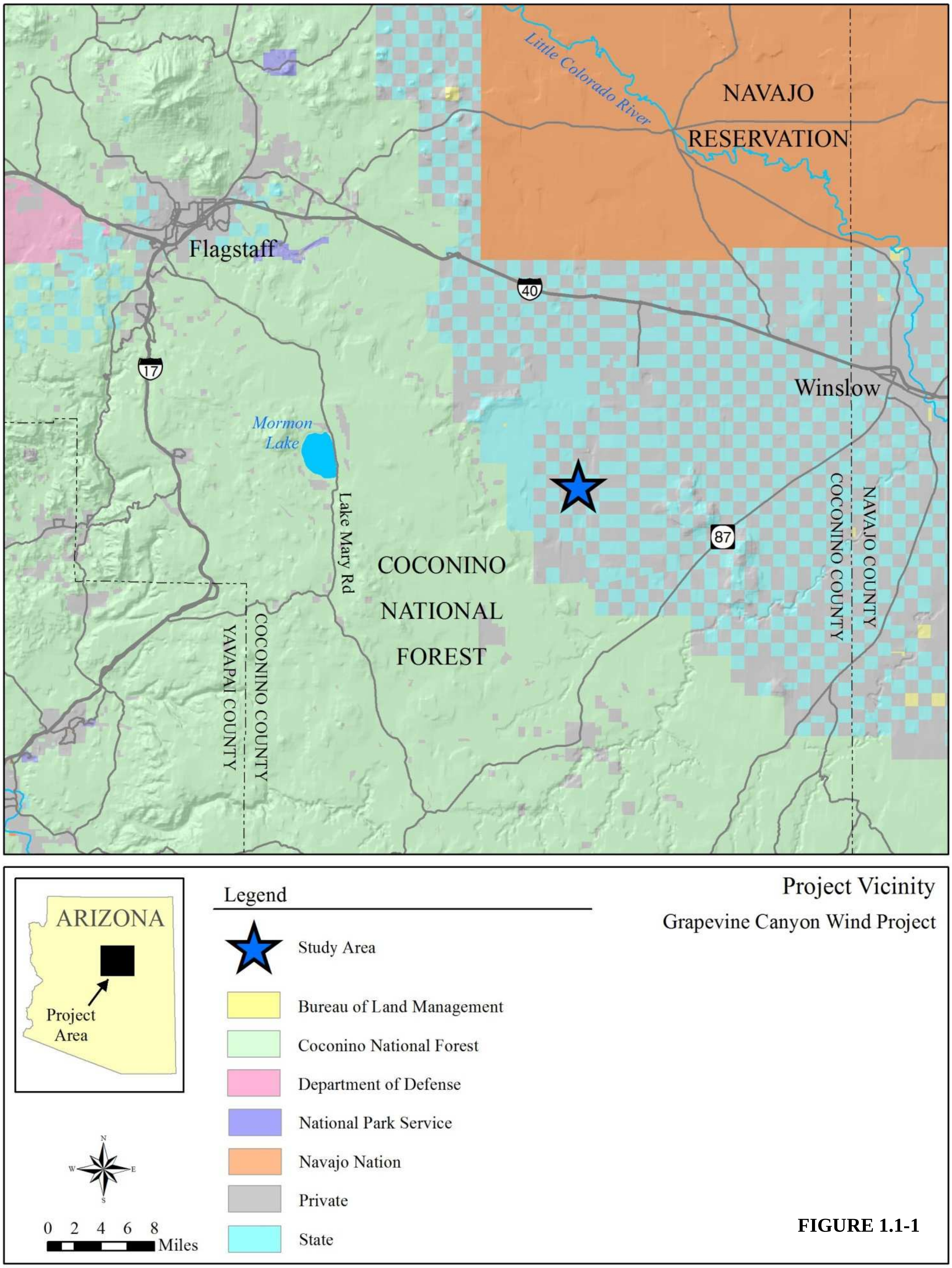
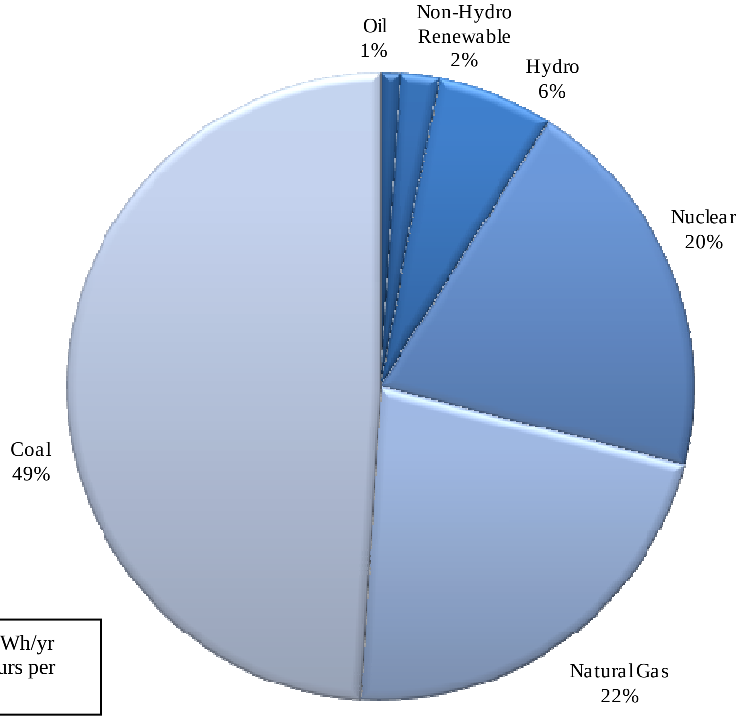

NAVAJO
RESERVATION
Little Colorado River
Flagstaff
40
17
Winslow
Mormon
Lake
Lake Mary Rd
87
COCONINO
NATIONAL
FOREST
COCONINO COUNTY
YAVAPAI COUNTY
NAVAJO COUNTY
COCONINO COUNTY
ARIZONA
Project
Area
Legend
Study Area
Bureau of Land Management
Coconino National Forest
Department of Defense
National Park Service
Navajo Nation
Private
State
0 2 4 6 8
Miles
Project Vicinity
Grapevine Canyon Wind Project

FIGURE 1.1-1

FIGURE 1.2-1
2007 U.S. ELECTRICITY PRODUCTION (TWh/yr) BY ENERGY SOURCE*



2007 (Actual) 4,137 TWh/yr
TWh/yr = terawatt-hours per year

Source: DOE, March 2009 - 2. DOE. March 2009.
EIA, *Annual Energy Outlook 2009*, DOE/EIA-0383(2009), March 2009. Located online at www.eia.doe.gov.

The Arizona Corporation Commission (ACC) adopted new Renewable Energy Standard and Tariff rules in 2006. The ACC's order was endorsed by the Arizona Attorney General's Office in 2007 as Arizona Administrative Code, Article 18, Rules R14-2-1801 through R14-2-1815 requiring public utilities in Arizona to provide 15 percent of their retail electricity from renewable energy sources by 2025. Other states in the western U.S. have similar portfolio standards ranging up to 33 percent in California. A summary of these requirements by State is included in Table 1.2-1.

TABLE 1.2-1
SUMMARY OF RENEWABLE ENERGY PORTFOLIO BY STATE

State	Percentages of Energy Portfolio Generated from Renewable Resources	Deadline
Arizona	15 %	2025
California	33 %	2020
Colorado	30 %	2020
Nevada	25 %	2025
New Mexico	20 %	2020
Utah*	20 %	2025

*Voluntary
Source: Pew Center 2009

Utilities in the western United States are seeking renewable energy as an important source of their generation mix. For example, a leading Arizona utility, through their resource planning process, anticipates that by 2025 the energy demand from customers will be 50 percent higher than today (Arizona Public Service 2009). To meet this growing need this utility is looking more and more toward renewable energy, with potentially 45 percent of this new demand being met by renewable sources. The Western Governors' Association has called for dramatic increases in energy produced by renewable resources in order to address climate change impacts and support workforce development and clean energy jobs (Western Governors' Association 2007).

The Western Governors' Association and other western State programs and initiatives have also identified an increasing concern between energy use and development and water resources. Sandia National Laboratory, for example, states that

> *…continued security and economic health of the United States depends on a sustainable supply of both energy and water. These two critical resources are inextricably and reciprocally linked; the production of energy requires large volumes of water while the treatment and distribution of water is equally dependent upon readily available, low-cost energy. The nation's ability to continue providing both clean, affordable energy and water is being seriously challenged by a number of emerging issues"* (Sandia National Laboratories 2007).

Energy produced by wind requires the least amount of water among conventional and renewable energy resources.

Foresight would like to construct and operate a utility scale wind energy generating facility that is tied into the regional grid so that the energy produced can be marketed to utility companies in Arizona and other western States to meet their State portfolio standards and energy requirements. Foresight's objectives include the following:

- To construct, own, operate, and maintain an efficient, economic, and reliable, utility scale wind generating facility that would help achieve State and/or regional renewable energy standards.
- To develop the wind energy generating facility on a site with an excellent wind resource.
- To interconnect to an electrical transmission system with available capacity that ties into the regional electric grid.
- To be consistent with the goals of the American Recovery and Reinvestment Act of 2009, which seeks to support home-grown renewable energy for economic recovery.
- To be consistent with Federal, Western Governors' Association, State and local goals for clean renewable energy and sustainable economic development.

1.2.2 Federal Agencies Purpose and Need

1.2.2.1 Western Area Power Administration

Foresight requests to interconnect its proposed Project with Western's electrical transmission system. Western's purpose and need is to approve or deny the interconnection request in accordance with its Open Access Transmission Service Tariff (Tariff) and the Federal Power Act, as amended.

Under the Tariff, Western offers capacity on its transmission system to deliver electricity when capacity is available. The Tariff also contains terms for processing requests for the interconnection of generation facilities to Western's transmission system. The Tariff substantially conforms to Federal Energy Regulatory Commission (FERC) final orders that provide for non-discriminatory transmission system access. Western originally filed its Tariff with FERC on December 31, 1997, pursuant to FERC Order Nos. 888 and 889. Responding to FERC Order No. 2003, Western submitted revisions regarding certain

Tariff terms and included Large Generator Interconnection Procedures (LGIP) and a Large Generator Interconnection Agreement in January 2005. In response to FERC Order No. 2006, Western submitted additional term revisions and incorporated Small Generator Interconnection Procedures and a Small Generator Interconnection Agreement in March 2007. Western's most recent Tariff revisions were filed in September 2009 to address FERC Order No. 890 requirements along with revisions to existing terms. In December of 2010 FERC issued an order granting Western's request for Declaratory Order subject to Western making a future compliance filing, which was ultimately approved by FERC in April of 2011.

In reviewing interconnection requests, Western must ensure that existing reliability and service is not degraded. Western's LGIP provides for transmission and system studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the proposed project and address whether the upgrades/additions are within the project scope.

1.2.2.2 U.S. Department of Agriculture, Forest Service, Coconino National Forest

In addition to the request for interconnection, Foresight has applied to the Forest Service for a special use permit for an electrical transmission tie-line which is located on Forest Service-managed lands. Western would apply for authorization from the Forest Service to construct the switchyard if the interconnection request is approved. The Forest Service is authorized to issue special use permits under the Federal Land Policy and Management Act. Consideration of special use requests are based on direction contained in 36 Code of Federal Regulations (CFR) 251, Subpart B, including screening criteria that address consistency with policies and land management plans.

In order to provide an interconnection with Western's electrical transmission system, the switchyard and the transmission tie-line would be located on Forest Service-managed lands, because the existing Western Glen Canyon-Pinnacle Peak 345-kV transmission tie-lines are located on Forest Service-managed lands. The special use permits would authorize Foresight and Western to construct, operate, and maintain the transmission tie-line and switchyard, respectively, on Forest Service-managed lands.

In addition, the Coconino National Forest Land Management Plan (Forest Plan) provides direction that the Forest Service must "evaluate requests for transmission corridors based on public need, economics, and environmental impacts of the alternatives" (Forest Service, Southwestern Region 1987). This Final EIS will fulfill the need to evaluate the environmental impacts of the proposed transmission tie-line.

Finally, a Memorandum of Understanding (MOU) among several Federal agencies, including the U.S. Department of Agriculture (USDA) and the U.S. Department of Energy (DOE), provides direction for efficient coordination of Federal agency review of electric transmission facilities on Federal land (October 23, 2009). The MOU is intended to "expedite the siting and construction of qualified electric transmission infrastructure" and provides direction for the Forest Service to work cooperatively with the DOE to efficiently permit appropriate transmission projects on public lands. Western has a site specific MOU with the Forest for existing facilities that would provide the framework for these new facilities.

1.3 STATUTORY, REGULATORY, AND POLICY AUTHORITY

1.3.1 Conformance with Forest Service Land and Resource Management Plan

The proposed project is in conformance with the Forest Plan of the Forest as discussed in Section 3.1.1.2. The current Forest plan is available online at http://www.fs.fed.us/r3/coconino/projects/plan-revision/1987_cnf_forest_plan_as_amended.pdf. The project is also in conformance with the language of the proposed action for the revised Forest Plan, which is located online at: http://www.fs.fed.us/r3/coconino/projects/plan-revision/documents/drafts-revised.shtml.

1.3.2 Federal and State Authorities

Foresight would adhere to all applicable federal and state laws and regulations guiding the actions of all entities involved in permitting the project as summarized below and in Table 1.3-1.

1.3.2.1 Arizona Corporation Commission

The ACC has jurisdiction over the siting of transmission tie-lines over 115-kV and thermal generating power plants within the State of Arizona. Foresight would obtain a Certificate of Environmental Compatibility (CEC) through the ACC for the transmission tie-line. If granted, the CEC would authorize construction of the 345-kV transmission tie-line under Arizona rules and regulations. The wind energy generating facility would not require a CEC since wind energy is not thermal generation. The interconnection switchyard would not require a CEC since Western, a Federal entity, would design, construct, and own the switchyard.

1.3.2.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) implements four treaties that provide for international protection of migratory birds. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of Interior. Unlike the Endangered Species Act (ESA), neither the MBTA nor its implementing regulations at 50 CFR Part 21, provide for permitting of "*incidental take*" of migratory birds.

1.3.2.3 Bald and Golden Eagle Protection Act and Eagle Conservation Plans

The Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c), enacted in 1940 and amended several times since then, prohibits anyone from "taking" bald eagles, including their parts, nests, or eggs without a permit issued by the Secretary of the Interior. BGEPA provides criminal penalties for persons who "*Take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof*." BGEPA defines "*take*" as "*Pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb*." "*Disturb*" is generally understood to mean

> *To agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior*.

In addition to immediate impacts, the definition above also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits and causes injury, death, or nest abandonment. A violation of BGEPA can result in a fine of $100,000 ($200,000 for organizations), or imprisonment for one year, or both, for a first offense. Penalties increase substantially for additional offenses, and a second violation of BGEPA is a felony.

Under BGEPA, the U.S. Fish and Wildlife Service (USFWS) published a final rule called the Eagle Permit Rule (50 CFR 22.26) on September 11, 2009. The regulation authorizes the limited issuance of permits to take bald and golden eagles ''*for the protection of… other interests in any particular locality*'' where the take is compatible with the preservation of the bald eagle and the golden eagle, is associated with and not the purpose of an otherwise lawful activity, and cannot practicably be avoided. The Draft

Eagle Conservation Plan Guidance explains the USFWS approach to issuing programmatic eagle take permits under this authority, and provides guidance to permit applicants (project proponents), USFWS biologists, and biologists with other jurisdictional agencies on the development of draft *Eagle Conservation Plans* (ECPs) to support permit issuance. EPCs provide a means of compliance with the BGEPA.

TABLE 1.3-1
SUMMARY OF KEY AUTHORIZATIONS AND APPROVALS

Entity	Regulation and/or Authorization
FEDERAL	
Western Area Power Administration	National Environmental Policy Act lead; Section 106 National Historic Preservation Act lead; Section 7 Endangered Species Act lead
U.S. Department of Agriculture, Forest Service	National Environmental Policy Act cooperating agency; Federal Land Policy and Management Act for rights-of-way; 36 CFR 251 Subpart B, Special Uses Regulations; National Forest Management Act, consultation with other Federal agencies for Endangered Species Act and National Historic Preservation Act
Federal Aviation Administration	Determination of No Hazard Air Navigation Permits; Notice of Proposed Construction or Alteration Application; Lighting Plan in compliance with Federal Aviation Administration Advisory Circular 70/7460-1K. 7460-2 Notice of Structures Reaching Full Height
U.S. Army Corps of Engineers	Clean Water Act Section 404
U.S. Department of Commerce/National Telecommunication Information Administration (NTIA)	Licensed Microwave Study; NTIA, Office of Spectrum Management Notification
U.S. Fish and Wildlife Service	Section 7 Endangered Species Act, Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act
STATE	
Arizona Corporation Commission	Certificate of Environmental Compatibility for Transmission Tie-line
Arizona Department of Agriculture	Native Plant Law; Notice of Intent to Clear Land
Arizona Department of Environmental Quality	Clean Water Act Section 402; Arizona Pollution Discharge Elimination System Permit; Air Quality Permit (batch plant, rock crusher); Other permits as required
Arizona Department of Transportation	Oversize/Overweight Load Permit
Arizona State Historic Preservation Office	Section 106 National Historic Preservation Act (consultation and concurrence)
Arizona State Land Department	Special Land Use Permit and Development/Energy Production Right-of-Way
LOCAL	
Coconino County	General Plan Conformance/Conditional Use Permit; Other ministerial permits as required
Private Landowners	Property easements/leases

1.4 SUMMARY OF PUBLIC AND AGENCY SCOPING AND DRAFT EIS COMMENTS

Interested parties were notified of the proposed project and the public comment opportunity through a Notice of Intent (NOI) published in the Federal Register on July 24, 2009 (Vol. 74, No. 141, page 36689). The NOI announced the scoping meetings held in Mormon Lake and Flagstaff, Arizona, and the deadline for submitting comments as August 28, 2009. It included a description of proposed facilities, project location, how to submit comments and why they are important, and how to contact Western. A packet of similar information was mailed on July 20, 2009 directly to nearly 400 members of the public including nearby landowners, previously-identified stakeholders, tribes, government officials, and agencies. A press release, radio announcements, flyers, newspaper advertisements, an e-mail notice, and Western's website provided additional notice and instruction for submitting comments beginning July 22, 2009.

A total of 27 parties participated in scoping and submitted 91 specific comments. Comments were received from individuals, businesses, Federal and State agencies, and a nonprofit organization. The issues, concerns, questions, and opportunities that were identified have shaped development of the Final EIS. A summary of the issues of concern to participants is included in Figure 1.4-1. Comments are summarized in Table 1.4-1. The Scoping Summary Report is included in Appendix B.1.

FIGURE 1.4-1
SUMMARY OF SCOPING COMMENTS RECEIVED

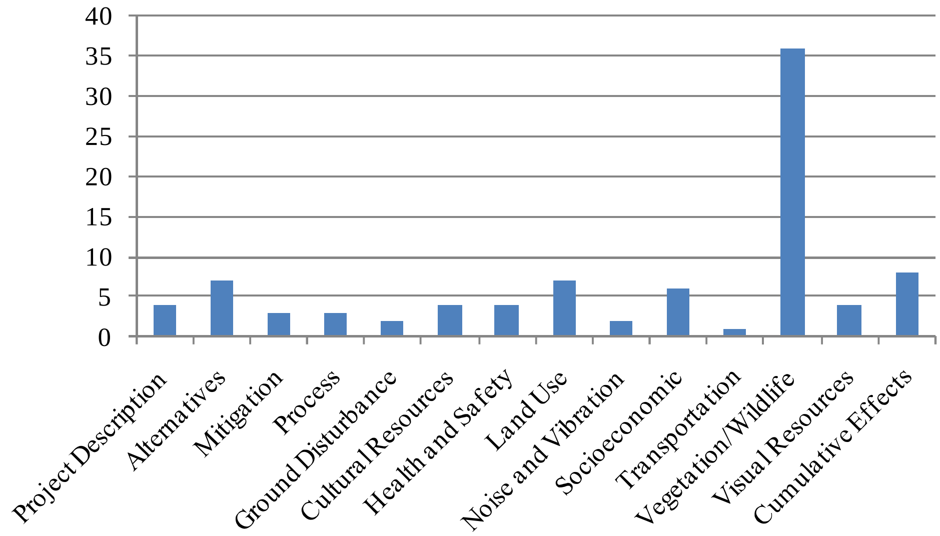


TABLE 1.4-1 SUMMARY OF PUBLIC AND AGENCY SCOPING CONDUCTED FOR THE DRAFT EIS		
Issue/Comment Type	**Comment Summary**	**Section Where Scoping Issue is Addressed in the EIS**
Project Description	• Details on the wind turbines, meteorological towers, and roads should be discussed.	2.2, 3.9
Alternatives	• An underground electrical transmission tie-line should be considered. • The transmission tie-line and turbines should be sited in order to minimize ground disturbance. • The output of the wind generation facility should be increased through the use of a greater number of wind turbines.	2.2, 2.6

TABLE 1.4-1 SUMMARY OF PUBLIC AND AGENCY SCOPING CONDUCTED FOR THE DRAFT EIS		
Issue/Comment Type	**Comment Summary**	**Section Where Scoping Issue is Addressed in the EIS**
Mitigation	• Following construction, all disturbed areas not essential to maintenance and operation should be recontoured and revegetated with native vegetation.	2.2, 2.7
Process	• The Arizona Game and Fish Department would like to participate in the NEPA process.	5.2
Ground Disturbance	• What is the amount of ground disturbance that will be associated with the project?	2.2
Cultural Resources	• How are tribes being involved in the project? • The area is rich in cultural resources and these should be located, documented, and protected.	1.3, 2.7, 3.3, 5.6
Health and Safety	• Low level aerial flights occur in the area and aircraft safety should be considered in the design of the project.	2.2, 2.7, 3.9, 3.10
Land Use	• Will the project area be open to the public and will hunting be allowed? • Address the proximity of the project to nearby landowners.	2.7, 3.1
Noise and Vibration	• Transporting heavy equipment and materials will create vibrations, which is a cause for concern. • The noise generated by the wind turbines should be discussed relative to ambient noise levels. • How will the noise generated by the wind turbines be mitigated?	2.2, 2.7, 3.9, 3.11
Socioeconomic	• Western should look at the specific impacts this project would have on existing customers and agreements. • Benefits of the project should be considered. • Who will pay to maintain public roads used by the project?	2.7, 3.7, 3.9
Transportation	• The site is not easily accessible to heavy construction equipment and materials. How will the site be accessed?	2.2, 2.7, 3.9
Vegetation and Wildlife	• Wildlife species inhabiting the area should be studied, and impacts to these species should be considered, in particular pronghorn, elk, deer, bats, and birds. • Measures should be taken through design and siting to minimize impacts to wildlife. • Pre- and post-construction biological monitoring should be implemented.	2.2, 2.7, 3.2
Visual Resources	• Topographic simulations should be developed to aid in understanding and visualizing the project. • Measures should be considered to minimize visual impacts.	2.7, 3.12
Cumulative Effects	• Cumulative, direct, and indirect impacts should be considered. • Western should consider the impacts of this project on existing agreements, including reliability and operations. • The effects of the Navajo Wind Project on Western's system should be considered.	1.2, 2.1, 4.0

1.4.2 Summary of Public, Agency, and Tribal Review of the Draft EIS

Interested parties were notified of the Draft EIS via postcards that were mailed or emailed to approximately 350 entities prior to the issuance of the Draft EIS to ask if and how they would like to receive the Draft EIS. Upon issuance of the Draft EIS, the U.S. Environmental Protection Agency (EPA) published a Notice of Availability (NOA) in the Federal Register on July 23, 2010 (Vol. 75, No. 141, page 43161). The NOA also announced a 45-day comment period for receipt of comments. Locally, Western published a display ad and the Forest published a legal notice in the Arizona Daily Sun with the NOA information and announcements of two public hearings held on August 17 and 18, 2010, in Mormon Lake and Flagstaff, respectively. Western also provided notification of the issuance of the Draft EIS and the hearings to entities with email addresses. Compact discs and/or hard copies of the document were mailed to 108 agencies, Tribes, organizations, and individuals. Copies of the Draft EIS were also available at the Forest Supervisor's Office in Flagstaff, the Flagstaff and Winslow Public Libraries, and Western's Desert Southwest Regional Office in Phoenix, Arizona. The Draft EIS was also posted on Western and Forest websites.

Western received 15 comment documents (letters, emails, comment card, and hearing testimony) as of September 7, 2011. It received three additional agency documents as of September 13, 2010, and included these in its review. All materials are indexed in Section 10.1 and reproduced in Section 10.3. In all, Western identified and bracketed 126 substantive comments (Figure 1.4-2). Western organized the comments into three broad areas of interest and developed tables with the comments and agency responses; these are also located in Chapter 10. Subcategories were used to cluster comments with similar themes (Table 1.4-2). Many comments resulted in changes to the Draft EIS in terms of factual content or analysis. In these cases, the location of the revision is provided both in a separate column and within the body of the response.

FIGURE 1.4-2
SUMMARY OF PUBLIC, AGENCY, AND TRIBAL COMMENTS RECEIVED ON THE DRAFT EIS

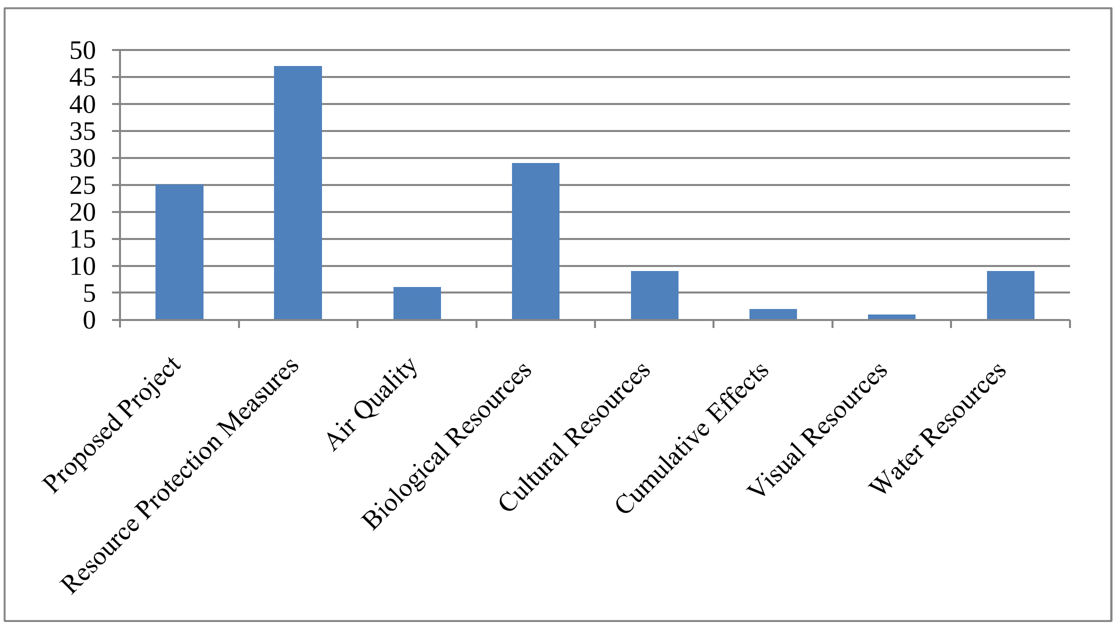


TABLE 1.4-2
SUMMARY OF PUBLIC, AGENCY, AND TRIBAL COMMENTS BY THEME

Category	**Sub-category**
Proposed Project	• Project Description (3) • Alternatives (3) • Project Feasibility (1) • Western's Actions (10) • Site Access (4) • Post Construction Restoration (1) • Decommissioning (3)
Resource Protection Measures	• Scope of Resource Protection Measures (2) • Ground Disturbance (1) • Revegetation (3) • Trench Work (2) • Minimizing Wildlife Impacts (2) • Mortality Mitigation (1) • Migratory Bird Protection (3) • Golden Eagle (5) • Threatened and Endangered Species (1) • Use of Guy Wires (2) • Big Game (3) • Pre-construction Wildlife Surveys and Post-construction Monitoring Studies (11) • Facility Design (6) • Scheduling Construction and Operation (5)
Air Quality	• Emissions Analysis (2) • Emissions Mitigation (3) • Climate Change (1)
Biological Resources	• Assessment of Impacts (11) • Bats (7) • Raptors and Other Birds of Concern (7) • Big Game (2)
Cultural Resources	• Government to Government Consultation (5) • Analysis of Impacts (4)
Visual Resources	• Impact to Meteor Crater National Natural Landmark (1)
Water Resources	• Wetlands (2) • Waters of the U.S. (7)
Cumulative Effects	• Sunshine Wind Project (1) • Golden Eagles (1)

1.4.3 Summary of Tribal Consultation

Western, as the lead Federal agency, is responsible for identifying, evaluating, and assessing effects of construction and operation of the proposed project on cultural resources in consultation with the Advisory Council on Historic Preservation, Arizona State Historic Preservation Office (SHPO), affected land-managing agencies, and affected Tribal governments. The following tribes have participated in the consultations with Western and the Forest Service in response to Western invitations:

- Hopi Tribe
- Zuni Tribe
- Navajo Nation
- White Mountain Apache Tribe
- Tonto Apache Tribe

Tribes were invited to provide assistance in evaluating Traditional Cultural Properties (TCPs), conducting cultural resource surveys, and developing ethnographic studies. In April 2010, representatives from the Zuni Tribe accompanied by Western archaeologists and one archaeologist from Transcon were flown by helicopter over the project area and were taken by foot to requested locations of interest adjacent to the project area. As a result of this field visit, the Zuni Heritage and Historic Preservation Office produced a report titled *Zuni Traditional Cultural Property Assessment and Cultural Issues Associated with the Proposed Wind Project, Coconino County, Arizona* and submitted as a confidential report to Western in June 2010. Zuni archaeologists also participated in cultural resources pedestrian surveys for the proposed transmission tie-line and alternative and switchyard on Federal land. Hopi archaeologists participated in the cultural resources pedestrian surveys for the proposed primary site access road and across Canyon Diablo on state and private land. Consultation efforts will continue into the construction stages of the proposed project. Major milestones in the consultation process are included in Table 1.4-3.

A PA was prepared by Western and executed by Western, the Forest Service, Arizona SHPO, and the Advisory Council on Historic Preservation. Foresight signed the PA as a concurring party. The PA establishes the area of potential effect for the proposed project, describes the Class III survey methodology to be used prior to final engineering design, proposes a treatment plan for identified resources that cannot be avoided, and describes procedures for unanticipated discoveries.

TABLE 1.4-3
TRIBAL CONSULTATION MILESTONES

Date	Action
October 15, 2009	Government-to-Government consultation letters to Tribal government representatives
October 27, 2009	Meeting with Tribal representatives
December 03, 2009	Western letter to Tribes requesting review of Draft PA
February 9, 2010	Meeting near Meteor Crater with Zuni, Navajo Nation, and Hopi
April 21, 2010	Meeting with Hopi
April 27–28, 2010	Tribal meetings and field visit with Zuni Tribe
March 24–28, 2010	Cultural Resources survey of transmission tie-line with Zuni archaeologists
August 17, 2010	Western, Foresight, and WEST, Inc. meeting with Hopi
October 27, 2010	PA sent to Concurring Parties, including Tribes, with invitation to sign PA
January 27, 2011	Western/Forest Service Meeting with Hopi Cultural Committee
March 15–18, 2011	Cultural Resources survey of primary access road with Hopi archaeologists
May 3, 2012	Western meeting with Navajo Historic Preservation Department

CHAPTER 2: PROPOSED ACTION AND ALTERNATIVES

This chapter describes the proposed wind energy generating facility, transmission tie-line, and Western's electrical switchyard and includes information about how the location of the wind energy generating facility was selected, as well as specific details of the site, facilities, construction activities, site access, and operation and maintenance activities. Alternatives are also described, including an alternative routing for the proposed transmission tie-line, no action alternative, and alternatives considered but eliminated. A summary is provided at the end of this chapter outlining Resource Protection Measures (RPMs) that are proposed to mitigate associated impacts.

The project is located in Coconino County, Arizona, approximately 18 miles southwest of Winslow and 28 miles southeast of Flagstaff (refer to Figure 1.1-1).

The scope of the review for this EIS includes all proposed project components of the up to 500 MW wind project and related infrastructure.

2.1 FEDERAL AGENCY PROPOSED ACTIONS

The proposed Federal actions evaluated in this Final EIS by each of the involved Federal agencies are specific and limited and are based on the purpose and need for agency action as described in Section 1.2.2. Proposed actions are as follows:

- <u>Western:</u> To approve Foresight's interconnection to Western's transmission system on the Glen Canyon-Pinnacle Peak 345-kV transmission lines, an action which also requires a new Western switchyard on Forest Service-managed lands. Although the switchyard would be constructed, owned, and operated by Western, details of the proposed switchyard are grouped under Section 2.2, Foresight's proposed project.
- <u>Forest Service</u>: To approve Foresight's special use permit authorizing a 200-foot-wide right-of-way to accommodate the construction, operation, and maintenance of a portion of a new 345-kV electrical transmission tie-line corridor across approximately 8.5 miles of Forest Service-managed lands (see Section 2.2.2 for a detailed description of the proposed transmission tie-line), as well as an approximately 15-acre parcel to operate and maintain a new Western switchyard (see Section 2.2.3 for a detailed description of the proposed electrical switchyard).

Western's preferred alternative is to approve Foresight's interconnection to Western's transmission system, including constructing the new switchyard to accommodate the interconnection. The Forest Service preferred alternative is Foresight's proposed project.

The decisions of both Western and the Forest Service will be documented in separate Records of Decision (RODs) and published in the Federal Register.

<u>2.1.1 Western System Modifications</u>

In response to the interconnection request, Western completed an Interconnection Feasibility Study, Interconnection System Impact Study, and Interconnection Facilities Study. Based on this study work, Western proposes to modify its transmission system as described in Section 2.2.3 with the addition of an electrical switchyard within the current and extended rights-of-way of the existing Glen Canyon-Pinnacle Peak 345-kV transmission lines. Foresight does not currently have a pending transmission service request with Western.

If, and when, Foresight makes a request for firm transmission service, Western would conduct appropriate studies to evaluate the request based upon the system conditions existing at that time. These studies could identify additional upgrades needed to accommodate the transmission service needs, including modifications at other existing Western substations that could include, but would not be limited to, installing new control buildings; new circuit breakers and controls; adding new electrical equipment, which would include installing new concrete foundations for electrical equipment and buildings, substation bus work, cable trenches, buried cable grounding grid, and new surface grounding material; and/or replacing existing equipment and/or conductors with new equipment and/or conductors to accommodate the requests for transmission service.

In the event that transmission system modifications/additions are required in order to meet a request for Firm Transmission Service from Foresight's generating facility, a separate NEPA process would be initiated and conducted for these facilities at the transmission service requestor's expense.

2.2 FORESIGHT'S PROPOSED PROJECT

Foresight proposes to construct and operate a utility scale wind energy generating facility on private and State trust land. The wind energy generating facility would generate up to 500 MW of electricity from wind turbine generators (WTGs).

The proposed project includes the following three main components, depicted on Figure 2.2.-1:

1. Wind energy generating facility (wind park)
2. 345-kV transmission tie-line
3. 345-kV interconnection switchyard—constructed, owned, and operated by Western (switchyard)

The wind park would, most likely, be constructed in two or more phases, if fully built out to 500 MW. The majority of the wind park components would be constructed concurrently for an initial phase, including new or improved site access and service roads, an Operations & Maintenance (O&M) facility, and up to two step-up substations. The number and timing of phases, and the number of turbines and size of each wind park phase, would be determined at a later time based on additional wind assessment, turbine model selection, and one or more power market agreements.

For ease in describing the proposed wind park, transmission tie-line, and switchyard, each of the three components is discussed individually in this chapter. Descriptions include site survey activities, construction activities, operation and maintenance activities, decommissioning activities where applicable, and a summary of construction and operation related ground disturbance.

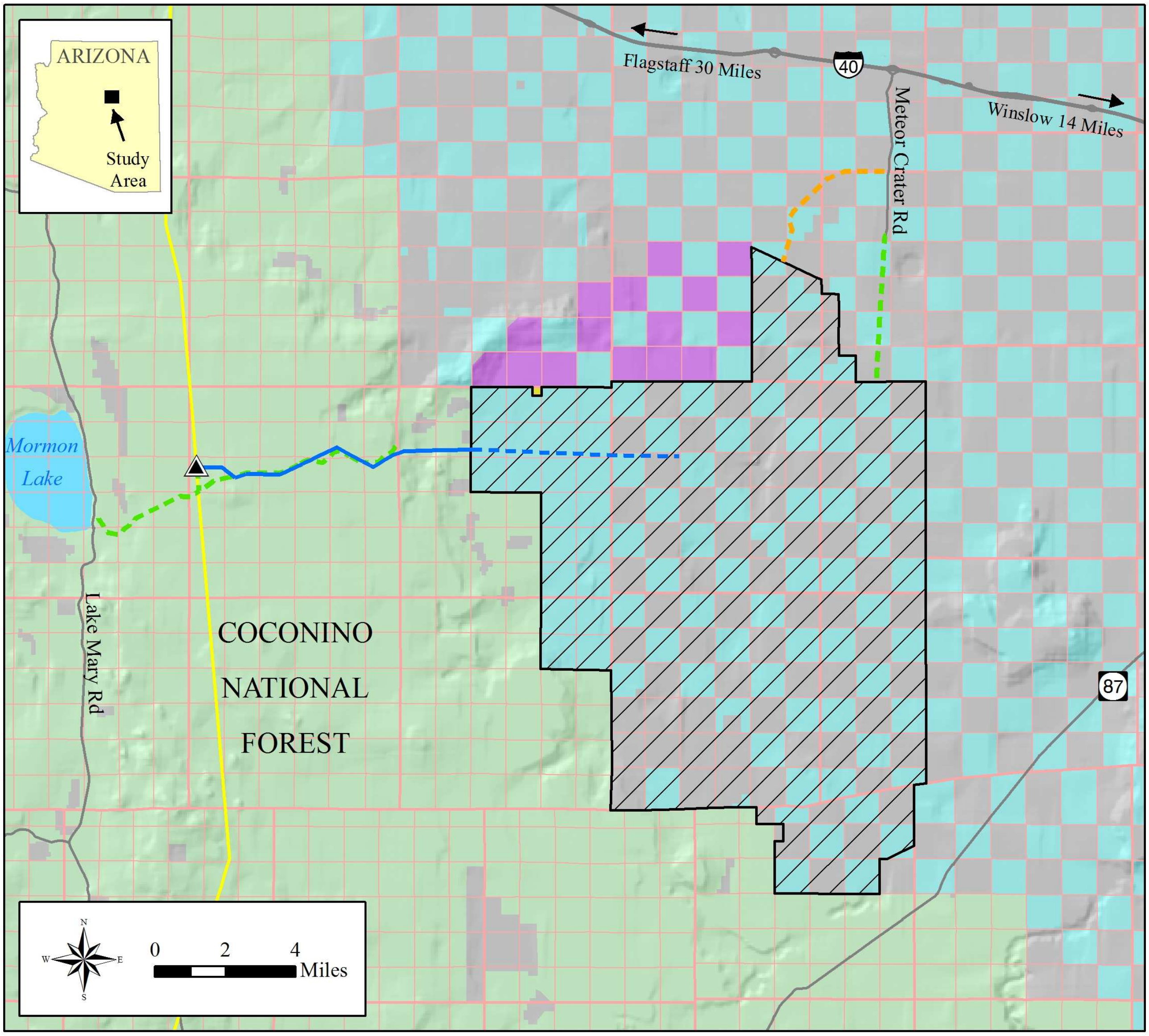
Wind parks are found throughout the United States and are typically sited in locations with strong prevailing winds. In Arizona, areas suitable for the development of utility-scale wind parks are generally located in the northern portions of the State. The screening process used to select the Grapevine Canyon Wind Park considered the following criteria:

- Availability of undeveloped wind resources suitable for utility-scale wind energy generation in a region that can serve power markets with portfolio standards.
- Suitability of site-specific conditions based on meteorological tower data and wind analysis.
- Ability to secure options for real property rights on contiguous lands suitable for wind energy generation.
- Ability to locate a wind project in an area where the County Comprehensive Plan cites wind energy as a viable land use.
- Location with transmission access to markets and utilities seeking to procure renewable energy.
- Availability of cost-effective transmission access.
- Proximity to interstate highway system for equipment transportation and site access.

Another critical factor in identifying the Grapevine Canyon Wind Park included its proximity to a 345-kV electrical transmission line corridor. The corridor includes the Glen Canyon-Pinnacle Peak No. 1 and No. 2 345-kV transmission lines, both owned and operated by Western. The transmission lines have capacity available to transmit additional electricity.

For the purposes of this EIS, the terms study area and project site are defined as follows:

- Study Area: The study area encompasses lands under evaluation for determining project site areas and specific locations for the wind park, transmission tie-line, site access, and switchyard (Figure 2.2-2). The study area includes all lands that would be defined in the future for the project site per phase (defined below). The study area covers approximately 150 sections of land, or approximately 150 square miles (approximately 96,000 acres). This study area substantially exceeds lands anticipated to be disturbed for the various wind park facilities. Construction of the wind park up to the proposed 500 MW is expected to temporarily disturb 2,050 to 2,193 acres and permanently disturb 555 to 570 acres of land. All wind park facilities would be located within the wind park study area in project site areas determined per phase.
- Project Site: The project site would comprise areas that would be directly disturbed by each phase of the wind park, transmission tie-line, and switchyard (see Table 2.2-1). The project site would be concentrated within a more limited portion of the broader study area. The project site would include the areas directly impacted by the placement of the proposed wind park, transmission tie-line, and switchyard as described below. The project site areas, including the exact location of wind park facilities, would be determined during final project design per construction phase, dependent on one or more power sale contracts. The exact location of wind park facilities (micro-siting) would be determined during final design, but the objective is that any such adjustments would be made to avoid or reduce impacts and would not increase impacts. To the extent that any pre-construction surveys provide information that minor adjustments in turbine siting or infrastructure would avoid or further reduce the impacts indentified in this Final EIS, feasible adjustments would be made to further avoid or reduce impacts to resources. Final (construction level) design and construction of all project infrastructure would be based on the following: (1) the estimated maximum disturbance and impact evaluations which are the basis for the analysis in the Final EIS, including the preliminary layout plan provided in this Final EIS; and (2) micro-siting resource information from the pre-construction surveys.
- Preliminary Layout Plan: The Final EIS includes a preliminary layout plan that depicts the planned infrastructure for the up to 500 MW project, as well as the preliminary layout plan for the project site area for the initial phase for up to 250 MW and the subsequent build-out phase project site area (Figure 2.2-3). The Final EIS includes a preliminary layout plan. For the environmental impacts analysis, resource specialists analyzed the range of potential impacts per resource for the up to 500 MW study area. The anticipated land disturbance and other impacts were addressed in the Draft EIS, based on the disturbance estimates in Table 2.2-4. For each resource, the maximum disturbance and/or impact was estimated. Subsequent to the Draft EIS, the preliminary layout plan was prepared to minimize and/or avoid impacts to resources including biological and cultural resources, and waters of the U.S. Utilizing the assumptions on land disturbance and other impacts prepared for the Draft EIS, the preparation of the preliminary layout plan involved the following tasks, which provided more detailed information: optimizing wind resources and incorporating additional meteorological information (as gathered between the time the Draft EIS and the Final EIS were prepared); further engineering analysis of the service roads and cabling/collection system and connection to the transmission tie-line; further analysis of construction to increase efficiency and decrease land disturbance; review of jurisdictional waters of the U.S.; survey of cultural resources for the transmission tie-line and interconnection switchyard on Forest-managed lands and the primary site access road; additional biological surveys (as conducted between the time the Draft EIS and the Final EIS were prepared); and adjustments to wind park infrastructure layout to reduce the amount of footprint/land disturbance to avoid or reduce resource impacts to sensitive resources.



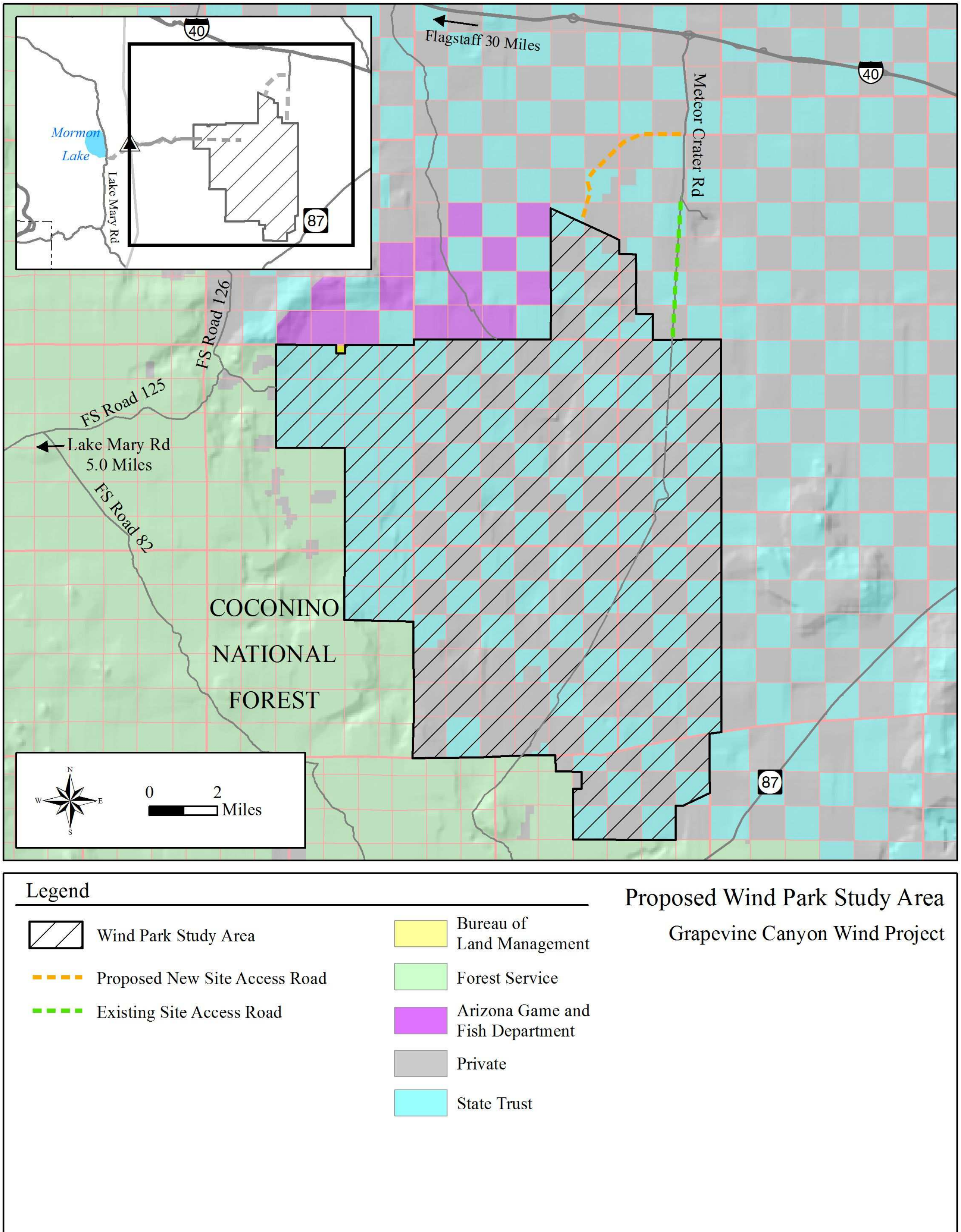
Legend

- Wind Park Study Area
- Proposed 345-kV Tie-line Alignment
- Proposed 345-kV Tie-line Alignment (Alignment to Be Determined)
- Proposed New Site Access Road
- Existing Site Access Road
- Proposed Interconnection Switchyard
- Existing Western 345-kV Transmission Lines
- Bureau of Land Management
- Forest Service
- Arizona Game and Fish Department
- Private
- State Trust

Applicant's Proposed Project

Grapevine Canyon Wind Project

FIGURE 2.2-1



Proposed Wind Park Study Area

Grapevine Canyon Wind Project

FIGURE 2.2-2

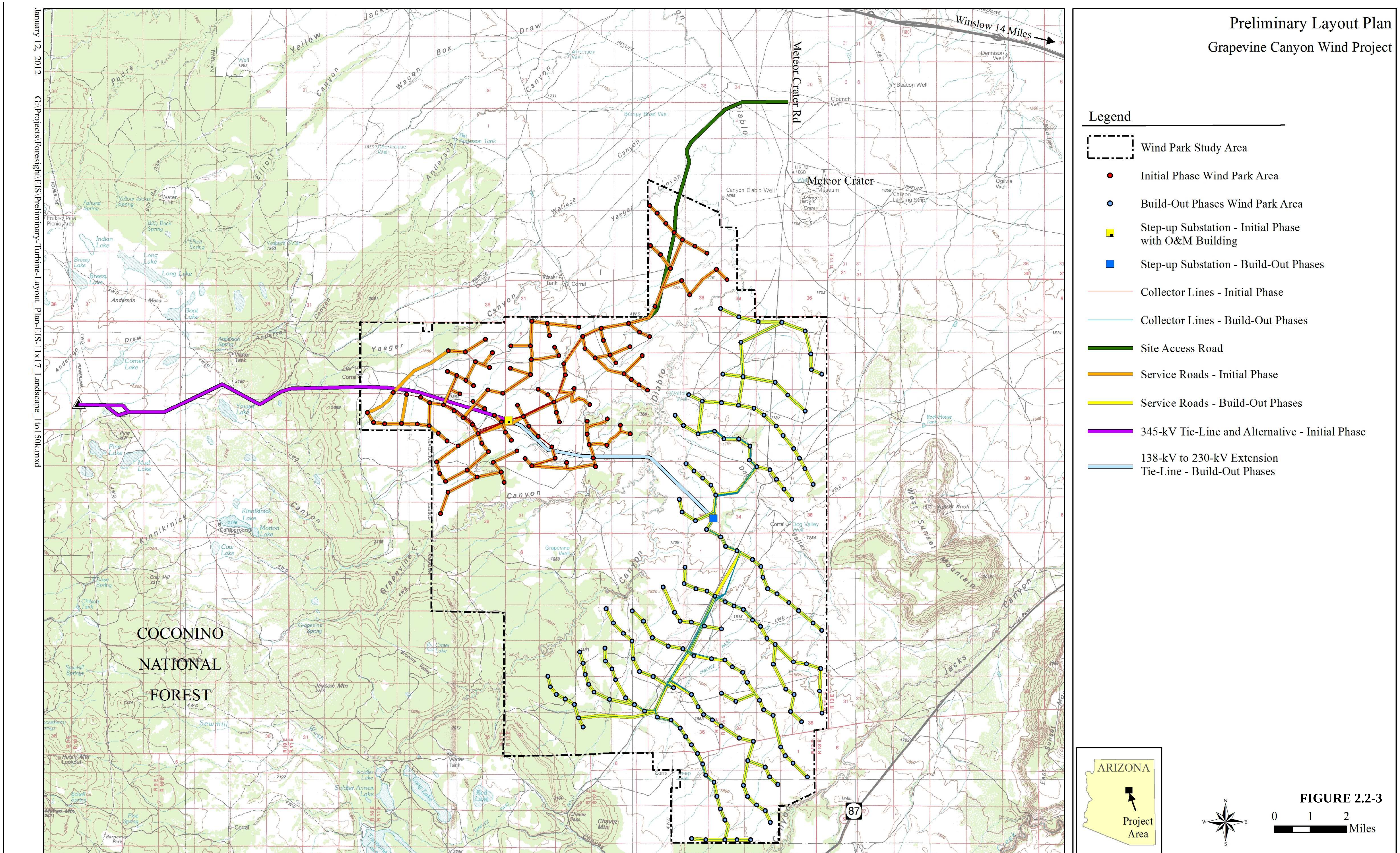

January 12, 2012
G:\Projects\Foresight\EIS\Preliminary-Turbine-Layout_Plan-EIS-11x17_Landscape_1to150k.mxd
Preliminary Layout Plan
Grapevine Canyon Wind Project
Legend
Wind Park Study Area
Initial Phase Wind Park Area
Build-Out Phases Wind Park Area
Step-up Substation - Initial Phase with O&M Building
Step-up Substation - Build-Out Phases
Collector Lines - Initial Phase
Collector Lines - Build-Out Phases
Site Access Road
Service Roads - Initial Phase
Service Roads - Build-Out Phases
345-kV Tie-Line and Alternative - Initial Phase
138-kV to 230-kV Extension Tie-Line - Build-Out Phases
Winslow 14 Miles
Meteor Crater Rd
Meteor Crater
COCONINO NATIONAL FOREST
87
ARIZONA
Project Area
FIGURE 2.2-3
0 1 2 Miles

TABLE 2.2-1 LEGAL DESCRIPTION BY LAND OWNERSHIP FOR STUDY AREA*			
Land Ownership	**Section(s)**	**Township**	**Range**
Forest Service (approximately 220 acres)	10, 11, 12, 13, 14, 15, 16, 17, 18	18 N	10 E
	7, 8	18 N	11 E
Trust Lands administered by ASLD (approximately 50,965 acres)	2, 4, 10, 12, 14, 16	16 N	12 E
	1, 2, 11, 12	17 N	11 E
	2, 4, 6, 8, 10, 12, 14, 16, 18, 22, 24, 26, 32, 34, 36	17 N	12 E
	2, 10, 12, 14, 22, 24, 26, 34, 36	17 N	12.5 E
	1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 23, 24, 25, 26, 35, 36	18 N	11 E
	2, 4, 6, 8, 10, 12, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36	18 N	12 E
	2, 10, 12, 14, 22, 24, 26, 34, 36	18 N	12.5 E
	12, 14, 24, 26, 36	19 N	12 E
	2, 14, 26, 34	19 N	12.5 E
	34	20 N	12.5 E
Private (approximately 44,035 acres)	1, 3, 5, 9, 11, 15	16 N	12 E
	1, 3, 5, 7, 9, 11, 13, 15, 17, 18, 19, 20, 21, 22, 23, 25, 27, 28, 29, 30, 31, 33, 34, 35	17 N	12 E
	1, 3, 11, 13, 15, 23, 25, 27, 35	17 N	12.5 E
	1, 3, 5, 7, 9, 11, 13, 14, 15, 17, 19, 21, 23, 25, 26, 27, 29, 31, 33, 35	18 N	12 E
	1, 3, 11, 13, 15, 23, 25, 27, 35	18 N	12.5 E
	1, 13, 23, 24, 25, 35	19 N	12 E
	3, 11, 22, 23, 27, 34, 35	19 N	12.5 E
	35	20 N	12.5 E

*Gila and Salt River Baseline and Meridian, Arizona
Source: USGS 7.5-minute quadrangle maps (Chavez Mountain East, Chavez Mountain NE, Chavez Mountain NW, Chavez Mountain West, Kinnikinick Lake, Meteor Crater, Mormon Lake)

2.2.1 Wind Park

A wind park consists of numerous WTGs and related energy generation and transmission infrastructure. The number and model of turbines are typically determined by one or more power sale contracts, the wind resource, and turbine availability and cost. The locations of WTGs are generally arranged in rows, spaced approximately one-quarter mile apart within rows, and approximately three-quarter mile apart between rows, known as arrays. Each of the WTGs generates electricity that is collected and transmitted to a new electrical step-up substation. Here, the voltage is converted for connection to the regional transmission system from which it can be made available for use or sale to the utility marketplace.

The proposed wind park study area is located entirely on private and State trust lands, not Forest Service-managed lands, currently used for ranching operations. The wind park study area is depicted on Figure 2.2-3. Figure 2.2-3 is a preliminary layout plan that depicts the planned infrastructure for the up to 500 MW project, as well as the preliminary layout plan for the project site area for the initial phase for up to

250 MW and the subsequent build-out phase project site area as discussed above. As noted in the above discussion of the Project site, to the extent that pre-construction surveys provide information that minor adjustments in infrastructure or turbine siting would avoid or further reduce the impacts identified in this Final EIS, adjustments that are feasible would be made.

The wind park would potentially generate up to 500 MW of electricity. It is anticipated that the wind park would be built in two or more phases. One or more power sale contracts would determine the wind park phases and the ultimate wind park size. Power sale contracts would determine size and the number of turbines per phase, timing of wind park phases, wind park layout and design, and related construction schedules.

The wind park would generate electricity from WTGs rated at 1.5 to 3.0 MW. For the purposes of this Final EIS, it is assumed, unless specifically noted, that a 1.8-MW WTG would be used (Figure 2.2-4). Using 1.5-, 1.8-, and 3.0-MW turbines as an example, if the wind park is fully built out to 500 MW, either 333 1.5-MW WTGs, or 277 1.8-MW, or 166 3.0-MW WTGs would be utilized.

The WTG model and size would be determined once final construction level wind analysis and project design are completed, and following one or more power purchase agreements. It is typical that, once selected, all of the WTGs would be the same model or have similar dimensions and be painted an industry-standard light gray or off-white.

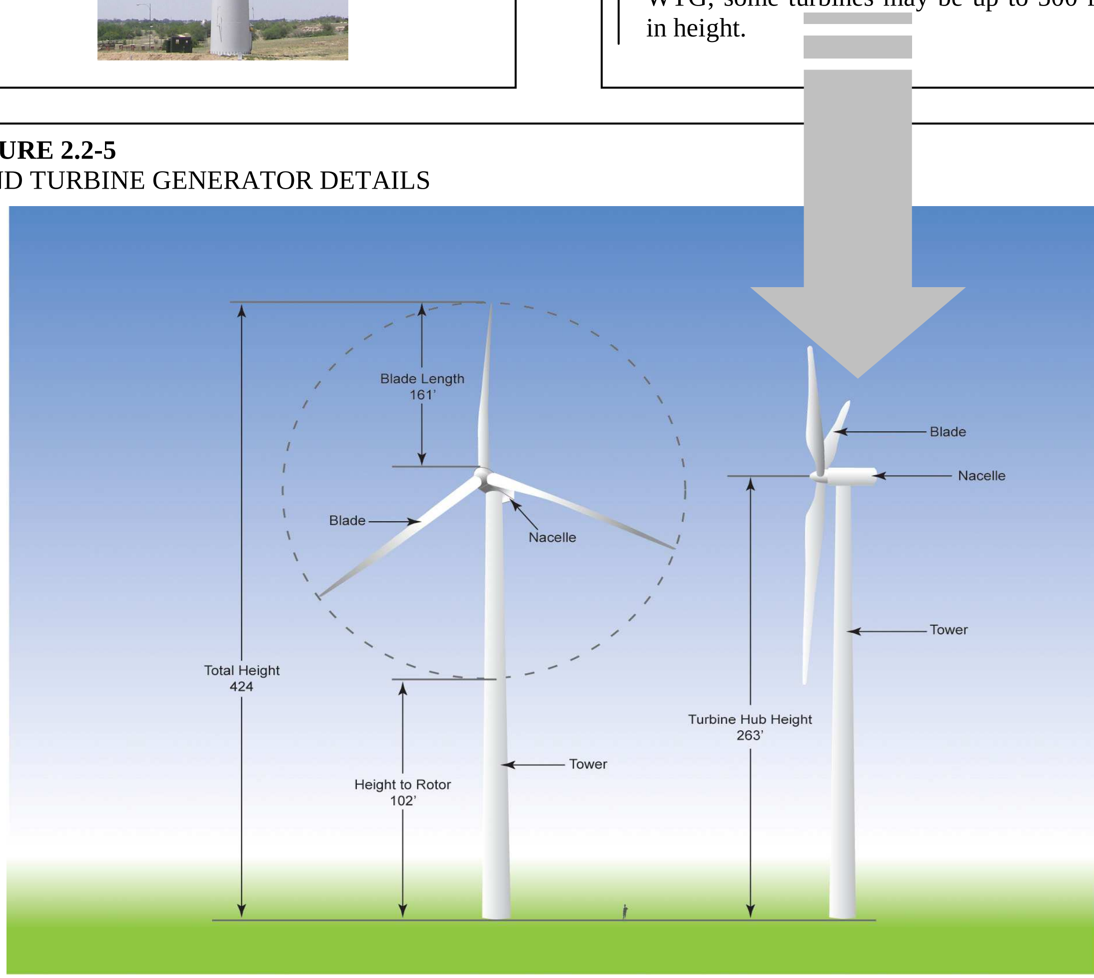
For purposes of this Final EIS, specifications for the Vestas V100 1.8-MW WTG are used to evaluate potential wind park impacts. This WTG is designed for high energy production for low wind sites and is suitable for northern Arizona’s wind resource, altitude, and temperature range. This 1.8-MW WTG is a tubular steel tower, 263 feet in height and 14 feet in maximum diameter. Three blades, each 161 feet in length, extend from a nacelle located at the top of the tower. In addition, the nacelle houses the generator equipment. A pad-mount transformer could be situated near the base, or located within the nacelle, depending on WTG selection (see Figure 2.2-4 and Figure 2.2-5).

In addition to the WTGs, other permanent components of the wind park would include an electrical collection system, up to two step-up electrical substations, communications system, operations and maintenance building, access and service roads, and meteorological monitoring towers.

FIGURE 2.2-4
TYPICAL WIND TURBINE GENERATOR

The WTG would be secured to a concrete foundation. A pad-mount transformer would be situated near the base or located within the nacelle depending on WTG selection. The nacelle, mounted at the top of the tower, would house the electric generator and a gearbox. The WTG is expected to utilize a pad-mount voltage step-up transformer. Each WTG rotor would have three blades made of laminated glass and carbon fiber. The length of the blades would depend on the turbine model chosen, but Foresight anticipates that blades would be approximately 161 feet long. Overall WTG height after construction would be approximately 424 feet from the ground to the tip of the turbine blade when in the 12 o'clock position. The towers would be an industry-standard, neutral light-grey or off-white to blend into the natural environment. Dimensions are based on a typical 424-foot WTG; some turbines may be up to 500 feet in height.

FIGURE 2.2-5
WIND TURBINE GENERATOR DETAILS



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2.2.1.1 Engineering Surveys for the Wind Park

A pre-construction engineering site survey would be performed to stake out the exact location of the WTGs, service roads, electrical collection system, access entryways from public roads, step-up substation, operations and maintenance building, and other project features per project phase.

Geotechnical or geophysical investigations would be performed to identify subsurface soil conditions, rock types, and strength properties for the design work of the roads, foundations, underground trenching, and electrical grounding systems.

Geotechnical investigations would occur at each turbine foundation location. For a 1.8-MW WTG, it is typical to perform soil borings to a depth of up to 31 feet at turbine sites using a 3.25-inch hollow-stem auger. Representative soil samples from the borings would be retained for further laboratory testing to evaluate the design specification for each WTG foundation. Boring holes would be backfilled after each test.

In addition, soil resistivity and thermal conductivity tests could be performed at select turbine sites. Resistivity would be tested by inserting probes into the ground to measure the resistivity of the soil. In addition, eight-inch borings would be performed to a depth of five feet and retained for laboratory testing of the thermal conductivity characteristics of the soil.

A Worst Case Fresnel Zone Study would be conducted to determine the locations of licensed microwave paths to further aid in locating each WTG to avoid conflicts with licensed communication pathways.

2.2.1.2 Construction of the Wind Park

It is anticipated that the wind park would be constructed in two or more phases. An initial phase, capable of generating up to 250 MW, would be constructed over a 12- to 18-month period of time. One or more subsequent phases would follow, resulting in a fully built-out wind park capable of generating up to approximately 500 MW. The timing and size of each phase would be dependent on one or more power sale contracts.

The wind park study area substantially exceeds lands anticipated to be disturbed for the wind park components. The location and siting of wind park infrastructure would be determined, per phase, based on additional wind assessment, turbine model selection, and one or more power market agreements.

Approximately 250 to 400 workers could be on-site during peak construction for the initial and subsequent 250 MW project phases. Construction activities would be temporary and would involve the use of heavy equipment, including bulldozers, graders, trenching machines, concrete trucks, tractor-trailer trucks, and large cranes. Table 2.2-2 lists the estimated type, number, and duration at the wind park site for construction equipment needed during construction of the proposed wind park.

TABLE 2.2-2 ESTIMATED TYPE, NUMBER, AND DURATION OF PROJECT CONSTRUCTION EQUIPMENT FOR A TYPICAL 250 MW PHASE		
Construction Phase/Equipment	**Estimated Average Number of Vehicles On-site During Construction**	**Estimated Duration (months)**
Site Preparation and Road Construction		
Bulldozer	2–6	4–12
Road grader	1–3	4–12
Compactor	1–3	4–12
Backhoe	1–3	4–12
Foundations / Borrow Pit / Batch Plant, etc		
Backhoe	2–5	4–8
Crane (5-ton)	2–5	4–8
Forklift	4–12	4–8
Collection System		
Trenching machine	1–3	4–12
Reel carrier	1–3	4–12
WTG Assembly and Erection		
Crane (500-ton)	1–2	4–8
Crane (100-ton)	2–5	4–8
Substation/O&M Facility* Construction		
Bulldozer D-6	1–2	4–8
Backhoe	1–2	4–8
Grader	1–2	4–8
Crane (5-ton)	1–2	4–8
*May include the construction of a septic system and drilling a well. If a well is required, a drilling rig would be used.		

Wind Park Mobilization, Staging, and Access

The initial steps in the construction of the wind park would include: constructing or improving access roads; establishing borrow pits and setting up a rock crusher and batch plant; developing a temporary power and water source; and establishing a wind park staging area.

Temporary Water

Water would be required during each project phase for construction activities, including dust control and preparation of concrete. Water would be sourced from one or more privately owned wells located on private land within the wind park study area.

Approximately 30 to 50 million gallons of water would be required during the initial up to 250 MW phase of construction, with between 60 and 100 million gallons of total water required for full wind park build-out during construction.

Potable water would also be sourced on-site from a private landowner and would be available at the wind park staging area during construction. While not anticipated, potable water could be sourced from one or more commercial water haulers if necessary.

Temporary Power

There are currently no sources of electricity on-site. A temporary source of electricity would be required for construction. Two options are under consideration as described below.

1. On-site Generation: Either multiple 5-kW or a single 50-kW, diesel generator would provide electricity during the construction period. Fuel would be purchased locally, and fuel would be housed on-site in accordance with requirements for on-site fuel storage.
2. Electrical Distribution Line: A temporary distribution line would be extended from an existing distribution line located along Meteor Crater Road. This line would be located adjacent to the primary site access road within a 60-foot-wide right-of-way and would not require separate access. The overhead line would be strung on wooden poles approximately 25 to 30 feet tall and spaced approximately 150 feet apart. Construction of the line would occur over three to five months and would require between 15 and 30 workers at its peak. If necessary to construct, this distribution line would conform to Avian Power Line Interaction Committee (APLIC) recommendations to reduce potential impacts to wildlife (APLIC 1994, 2006).

Borrow Pits, Rock Crusher, and Batch Plant

Base material and aggregate required in the construction of the roads, staging areas, WTG foundations, transmission tie-line structure foundations, operations and maintenance building foundation, and the up to two step-up substations are expected to be sourced on-site from within the wind park study area. The use of on-site borrow pits would eliminate the need to bring in raw materials that would require a substantial number of heavy truck trips to and from the wind park study area during construction. The borrow pits would become operational prior to road construction activities and would remain in operation until construction of the wind park and transmission tie-line are completed.

One or more borrow pits would be located within the wind park study area on private land. Each of these would be approximately two to four acres in size and would provide aggregate that would be needed for wind park construction, as well as construction of the transmission tie-line. The locations of these borrow pits have not been determined, but would be subject to geological analysis. If it is determined that aggregate material from these borrow pits would be used on Forest Service-managed lands, the sites would be surveyed for noxious weeds and material colors would match the existing landscape where they would be utilized.

Breaking or blasting to fracture and loosen the limestone base could be required at each borrow pit. Blasting activities would be conducted by professionally trained and certified explosives experts and would employ industry-standard techniques.

Quarried materials would be transported to a portable rock crusher located at each pit. The rock crusher would process the raw materials into aggregate for base construction material and concrete. The rock crusher would operate during the construction periods for the wind park and transmission tie-line. Each crusher would be located in an area approximately two acres in size and typically surrounded by a one-foot high earth berm to contain water runoff. A portable source air quality permit would be required for operation of each rock crusher.

One or more portable concrete batch plants (Figure 2.2-6) would be located within the wind park study area on private and/or State trust land. The location of each batch plant site would be determined during construction planning. Each batch plant would require an area approximately two acres in size, including an area for the batch plant and stockpiling of materials such as sand, cement, and water. Batch plants would be used to mix concrete for use in the WTG foundations, transmission tie-line structure foundations, and other facilities that would require the use of concrete. At least one batch plant would be in operation throughout the construction period of the wind park and transmission tie-line. Each batch plant would require a portable source air quality permit.

Batch plants and rock crushers would be powered by portable electric generators, and fuel would be stored on-site in accordance with requirements for on-site fuel storage.

FIGURE 2.2-6
TYPICAL PORTABLE BATCH PLANT

Source: http://www.cemcoinc.comproducts.php

Staging Areas for the Wind Park

Staging areas are typical of construction and are multi-purpose areas used to store and assemble materials. A temporary wind park staging area would be developed on approximately 8 to 12 acres within the wind park study area per project phase. The location of the wind park staging area would be determined upon final wind park design and layout. The wind park staging area would be used for construction safety meetings, to host office trailers, temporary sanitation stations, parking for equipment, vehicle parking for equipment operators and construction workers, and staging for limited wind park components.

An additional on-site temporary staging area would be used during access road construction for equipment and employee parking. The staging area would be approximately four to six acres in size and may or may not be located in the same place as the larger staging area described above, but would be located with the wind park study area on private land.

Staging areas would be prepared by clearing and grading as needed. The areas would then be covered with four to six inches of gravel to provide a level ground surface. The gravel would be sourced from borrow pits on-site. Excess spoil material and topsoil salvaged from the site would be used for top-fill in other construction areas.

Temporary security fencing could be located around construction staging areas. If utilized, fencing would be a six-foot-high chain link structure with additional security wiring located at the top. When construction is complete, the fencing around the staging areas would be removed.

Temporary staging areas would be reclaimed once construction is complete. The initial wind park staging area would be kept, but reduced in size to accommodate permanent parking and other uses near operations and maintenance facilities. Excess gravel would be removed and salvaged for resale to other construction projects in accordance with landowner requirements.

Wind Park Primary Access and Service Roads

Construction and improvement of the new and existing primary access and service roads would occur over a period of four to six months and would require between 50 and 100 workers at its peak. The primary site access road would be constructed for the initial Project phase.

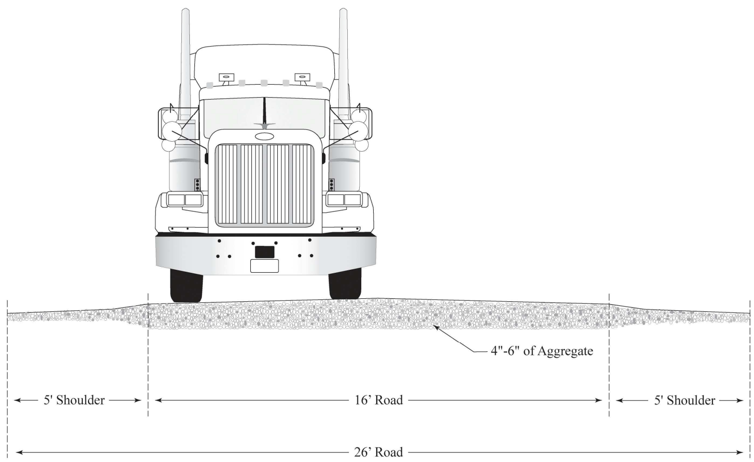
Primary access and service roads would be improved or designed and constructed to State and Federal Water Quality Certification Standards for Linear Transportation Projects. The roads would be constructed using typical road construction equipment, including a bulldozer, grader, front-end loader, excavator, and a small crane. The roads would be cleared of vegetation and excavated to a depth of up to 12 inches and covered with approximately 4 to 6 inches of aggregate. The road surface would then be graded and compacted. Berms and other drainage features would be constructed as required. Topsoil removed during road construction would be used for top fill or stockpiled for berms and other drainage features.

Trucks and other vehicles would access the wind park study area from Interstate-40 (I-40) at the Meteor Crater Road exit. In order to accommodate construction traffic, additional gravel could be placed on already disturbed roadway shoulders at the intersection of I-40 and Meteor Crater Road. No off-site improvements have been identified at this time. If off-site transportation roadway improvements are in the future, after the completion of the Final EIS, any environmental impacts associated with these modifications would be addressed in accordance with regulatory requirements.

The primary site access road would originate from Meteor Crater Road and would extend to the west across Canyon Diablo and then south into the wind park study area. The access road would be constructed as a new all-weather, compacted gravel road approximately eight miles in length. The road would generally be 16 feet wide, with a 5-foot shoulder on either side (Figure 2.2-7).

The primary access road would require a crossing of Canyon Diablo. This crossing is expected to occur at one of three suitable locations that have been identified based on a preliminary evaluation (Figure 2.2-8). The final crossing location, structure, and design would be determined based on engineering and analysis completed during the design of the wind park. It is anticipated the crossing would require a bridge-type structure with a span of up to 80 feet and a roadway width of approximately 16 to 18 feet. The crossing would be designed to maintain stream flows and prevent erosion. In addition to Canyon Diablo, the road is expected to cross up to five smaller ephemeral washes. Culverts would likely be placed within these washes at crossings. Up to 75 feet on either side of the road would be disturbed where culverts or other drainage structures are located. Design and construction of the roads and crossing would be in accordance with the RPMs and Section 404 permit for the initial phase and subsequent phase(s) and compliance with County and other applicable road and crossing standards. These permits would be obtained pre-construction and based on final engineering design for the initial and subsequent phases.

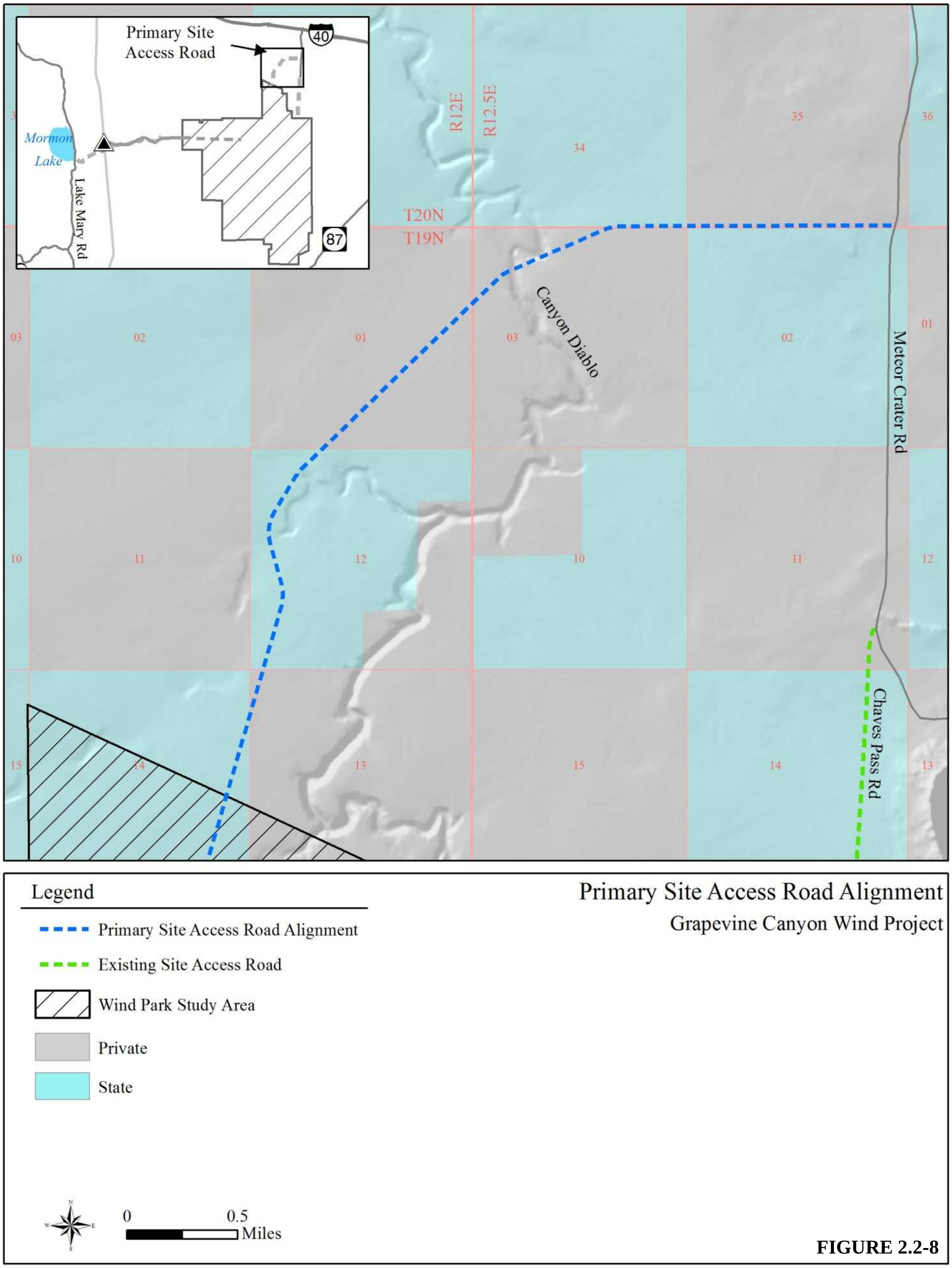
FIGURE 2.2-7
CROSS-SECTION ILLUSTRATION OF TYPICAL PRIMARY SITE ACCESS ROAD



In addition to the primary access road, Chavez Pass Road, an existing road located between Meteor Crater Road to the north and State Route 87 to the south, could also be used for site access for subsequent wind park phases. Chavez Pass Road is maintained by the County and it is anticipated the road would not need to be recontoured or be upgraded outside of the existing roadway. If used, minor grading could be necessary and new surface material added, but no improvements are anticipated to be made outside of the current road area.

Once primary access has been established, service roads to each WTG site and other wind park facilities would be constructed. Up to approximately 143 miles of service roads would be needed if the wind park is fully built out to 500 MW. All service roads would be located within the wind park study area on private and/or State trust land. Service roads would be sited to minimize disturbance and maximize transportation efficiency. Existing roads, ranch roads, and two-track trails would be used to the extent possible. Service roads would be constructed to the same specifications and standards as the primary site access road with the exception of an additional five feet on either side resulting in a ten-foot shoulder (Figure 2.2-9). This additional width is necessary to facilitate the movement of a large crane from one WTG to the next. Following construction, this additional shoulder width would be reclaimed.

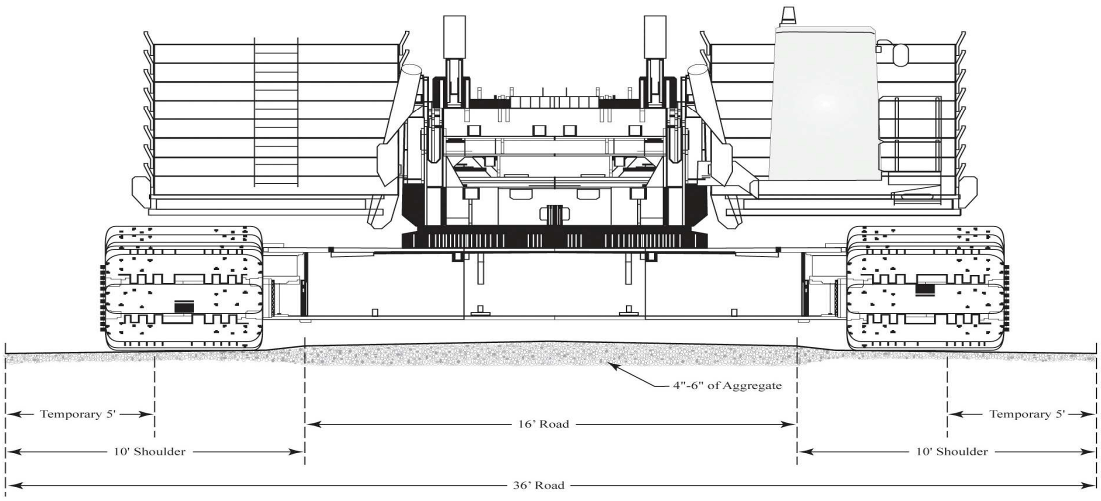
The wind park perimeter would not be fenced, and access to public land would not be gated. Primary access to the wind project on private land and trust lands administered by ASLD would be via a newly constructed access road for which the ASLD anticipates issuing a non-exclusive right-of-way for the Project, grazing lessees, and private landowners. Access to certain portions of the wind park on Federal, State, and private land could be restricted for public safety and project security.



Primary Site
Access Road
40
Mormon
Lake
Lake Mary Rd
87
R12E
R12.5E
T20N
T19N
35
36
34
Canyon Diablo
Meteor Crater Rd
03
02
01
03
02
01
10
11
12
10
11
12
15
14
13
15
14
13
Chaves Pass Rd
Legend
Primary Site Access Road Alignment
Existing Site Access Road
Wind Park Study Area
Private
State
Primary Site Access Road Alignment
Grapevine Canyon Wind Project
0
0.5
Miles

FIGURE 2.2-8

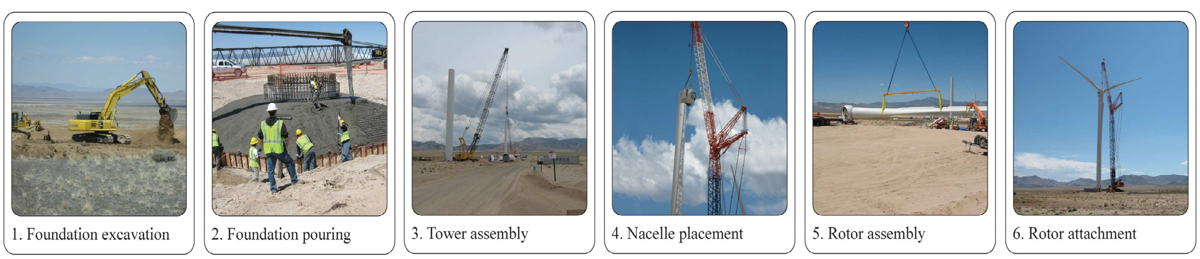
FIGURE 2.2-9
ILLUSTRATION OF TYPICAL SERVICE ROAD TO ACCOMMODATE LARGE CRANE



Construction of Wind Turbine Generators

The typical construction sequence of the WTGs is depicted in Figure 2.2-10 and described below.

FIGURE 2.2-10
TYPICAL WTG CONSTRUCTION STAGES



An area approximately 2.2 acres in size at each WTG location would be cleared with a grader and excavated with a backhoe to prepare for each concrete foundation and to accommodate the WTG, temporary work areas, and a crane pad. The crane pad would be an approximate 50-foot by 50-foot compacted and graveled area adjacent to each WTG and would remain after construction.

Each turbine and pad transformer, if required, would require foundations. The most likely foundation design for the Vestas V100 WTG is a spread footing with an octagonal base. Each foundation would consist of approximately 25 to 40 tons of steel and approximately 350 to 400 cubic yards of concrete per WTG. The excavated area would be approximately 10 to 15 feet deep and 45 to 60 feet in diameter. A 16-foot-diameter pedestal would be centered within the foundation footprint with approximately 1 foot of the foundation protruding above grade. Excess excavated material, including topsoil, would either be stockpiled for backfill and reclamation, or disposed of in accordance with applicable regulations and permit conditions.

Each WTG would be assembled and erected by cranes in multiple stages. A 400-ton crane would likely be used similar to the model illustrated in Figure 2.2-10. The crane would arrive to the wind park in sections and be assembled on-site.

The components of each WTG would arrive via semi-trailers. If one crane is utilized at the site, 10 to 13 semi-trailer loads of wind facility components would be transported and offloaded at the project site per equipment delivery day; if two cranes are utilized at the site, 20 to 26 trailer loads would be transported and offloaded per equipment delivery day.

WTG assembly would involve connecting the anchor bolts to the concrete foundation, erecting the four-section tower, erecting the nacelle, assembling and erecting the rotor, connecting the internal cables, and inspecting and testing the electrical system prior to operation.

The blades would be assembled into a rotor assembly on the ground prior to placement on the nacelle. The rotor assembly consists of connecting the three blades to the hub. The hub is the central element that connects the blades to the shaft of the gearbox. The hub would be placed on a special stand that elevates it approximately eight feet above grade. The blades would then be individually attached to the hub, and then raised into place by the crane and attached to the nacelle.

Construction of Electrical Collection System

Construction of the collection system would last approximately 10 to 14 months and would occur prior to or concurrent with WTG construction. Approximately 15 to 30 workers would be on-site during peak construction.

To the extent possible, the collection system would be located adjacent to the WTG service roads to minimize disturbance. Approximately 241 miles of 34.5-kV collection lines would be needed if the wind park is fully built out to 500 MW. The collection system would be located within the wind park study area on private and/or State trust land, and the majority of the collection system would be underground. However, if a combination of underground and overhead collection system is utilized, the length of underground collection system would be proportionally reduced by the length of overhead collection line. Each collector line would consist of three cables: an electrical conductor, a solid copper (unshielded) ground wire, and a fiber optic line.

The underground collection lines would be constructed by excavating trenches to a minimum depth of four feet, depending on the underlying soil and rock conditions, and to a width of one to two feet. The three cables would then be placed in the trench, and the trench would be backfilled with a warning tape placed 12 to 18 inches above the cabling.

Temporary disturbance resulting from the construction of the underground collection system would include tracks from the trenching equipment and a three- to five-foot swath of disturbed soil as a result of excavating and backfilling the trench. All surface disturbances would be limited to a 25-foot-wide construction corridor, inclusive of temporary construction disturbance and any collection line service roads.

If utilized, the overhead collection lines would be supported by wooden poles approximately 25 to 30 feet tall and spaced approximately 150 feet apart. The lines would be constructed in two phases, using typical construction techniques. First the pole structures would be set using a single multi-purpose truck. The truck would include a small crane suitable for lifting and placing poles. A pole trailer would be towed behind the crane truck to transport the poles to the installation site. Affixed to the crane would be an auger for boring the holes for the pole structures. Soil excavated during construction would be used for backfill and for restoration of disturbed areas. Second, cable would be installed using a cable truck and a truck with a person lift. The cable would be strung out along the installation route and the man lift would be used to place the cable on the pole structure.

Temporary construction and permanent service access to the line would be primarily provided by the WTG service roads. In areas where overhead collection cannot be collocated with the WTG service roads, surface disturbance would be limited to a 25-foot-wide construction corridor.

Construction of Communications System

The communication system for the wind park includes a series of fiber optic cables connecting the WTGs. The fiber optic cable would connect each WTG to the step-up substations. The fiber optic cables would terminate at a switchgear enclosure located within the proposed step-up substations. Data could be transmitted via an on-site microwave tower or via a fiber optic cable included on the transmission tie-line to the switchyard. The fiber optic cables would be installed at the same time as the electrical collection system, either within the same trench or attached to the same overhead structures.

Construction of the Step-Up Substations

Two step-up substations, for initial and build-out phases, would be located within the wind park study area on private and/or State trust land (Figure 2.2-3). Each substation would be sited on an approximately four-acre parcel with an additional two acres disturbed during construction activities (see Table 2.2-4). An extension tie-line approximately seven miles in length, ranging between 138-kV and 230-kV, would connect the two step-up substations. Pole structures for the extension tie-line would be 100 to 180 feet in height. Construction would involve site grading, installing gravel material within the fenced area of the substation, constructing concrete foundations for the transformers and other components within the substation, installing substation equipment, and erecting a chain-link security fence around the substation perimeter. Figure 2.2-11 includes a picture of a typical step-up substation. A bulldozer, backhoe, grader, crane, and general purpose trucks would be used in the construction of the substation. It is expected that each substation would be constructed over a four- to eight-month period, and 15 to 25 workers would be on-site during peak construction.

Construction of the Operations and Maintenance Building

The O&M facility would be located within the wind park study area on private and/or State trust land on an approximately 2.4-acre parcel, typically co-located with the wind park construction staging area. Drainage features would be constructed, if needed. Construction of the O&M facility would include foundation preparation and pouring, framing the structure and roof trusses, installing the outer siding, installing plumbing and electrical work, and finishing the interior carpentry. The facility would typically require a septic system and potentially a well. Once complete, the O&M facility would have the appearance of a typical prefabricated steel building.

Equipment required for construction of the O&M facility would include a bulldozer, road grader, compactor, backhoe, concrete mixer, crane, and general purpose truck. Construction of the O&M facility would be accomplished in approximately four to six months with approximately 15 to 30 workers on-site during peak construction.

FIGURE 2.2-11
TYPICAL STEP-UP SUBSTATION

Meteorological Towers

Several temporary meteorological (met) towers have been constructed over the past several years within the wind park study area on private and State trust land to gather wind data indicating the feasibility of the wind park. These existing towers would remain in place until construction of the wind park is complete. In addition, up to five additional temporary met towers could be installed prior to construction to further analyze the wind resource across the wind park study area. Temporary towers would be decommissioned and removed during the construction process for wind park phases.

Up to 16 long-term or permanent met towers would be used to monitor wind conditions at the site if the wind park is built out to 500 MW. These met towers would be free-standing structures, approximately 263 feet tall, constructed of steel lattice. A typical long-term met tower is depicted in Figure 2.2-12. Construction equipment needed for the installation of the met towers would include a bulldozer, road grader, and compactor for site preparation; a backhoe and concrete mix truck for the foundation; and a crane and general purpose truck for erection of the towers. Approximately six to nine workers would be on-site during construction of each of the permanent met towers over approximately two weeks per tower.

FIGURE 2.2-12
TYPICAL LONG-TERM MET TOWER

Security During Wind Park Construction

The wind park owner or manager would develop and implement a security plan to effectively monitor the wind park activities during construction. A security plan would be developed and adapted throughout the course of construction to address the level of construction activity and the type of equipment being used. Construction lighting would be in conformance with the Coconino County Lighting Ordinance.

Construction materials would be stored at individual WTG locations or at the staging areas. Temporary fencing with a locked gate could be installed around a roughly 1.5-acre area adjacent to the O&M facility for temporary storage of any special equipment or materials.

2.2.1.3 Operation and Maintenance of the Wind Park

Wind Park Start-Up

Plant commissioning would follow mechanical completion of the wind park, transmission tie-line, and switchyard and would begin with a detailed plan for testing and energizing the electrical collection system, step-up substations, transmission tie-line, and interconnection switchyard in a defined sequence with lock and tags on breakers to ensure safety and allow for fault detection prior to energizing any component of the system. Once the step-up substation is energized, feeder lines would be brought online, one by one. Individual turbines would then be tested extensively then brought online, one by one. Commissioning does not require any heavy machinery to complete.

Wind Park Operating Requirements and Staffing

Operating Schedule

The wind park would be in operation 24 hours per day, 365 days per year. The wind park would be staffed as necessary to provide operational maintenance and environmental compliance support. The wind park's central Supervisory Control and Data Acquisition (SCADA) system would stay online fulltime, 24 hours per day, 365 days per year.

Operation and Maintenance Staff

The wind park would be operated and maintained by a team of approximately 17 to 40 personnel if fully built out for a typical 500 MW project, consisting of the following staff positions (Table 2.2-3):

TABLE 2.2-3
TYPICAL WIND PARK OPERATION AND MAINTENANCE STAFFING
(BASED ON UP TO 500 MW WIND PARK)

Position	**Number of Personnel***
O&M Project Manager	1
Administrative Assistant	1
I&E Technician	1–2
Lead Wind Turbine Technician	1–3
WTG Technicians (Technician 1, Technician 2)	12–32
Misc services (security, housekeeping, general maintenance)	up to 0.5

*dependent upon on quantity and type of turbine selection

Fencing and Security

The wind park perimeter would not be fenced. Public access across wind park service roads that connect to wind park infrastructure would be based on consultation with the private and State landowners. Service roads that do not access public lands could be gated. A lockable steel door at the base of each WTG would restrict access to authorized personnel only. If the selected WTG requires a pad-mount transformer, these would be locked. Consistent with industry standard practices, WTGs and pad-mount transformers would not be fenced.

The step-up substations would be fenced and gated to industry standards for electric utility infrastructure. The area would be secured and limited to authorized personnel.

Wind Park Power

During the operating life of the wind park, electricity for the O&M facility would be needed. Once Western's interconnection switchyard, and the wind park's transmission tie-line, and up to two step-up substations are complete and energized, station power to the wind park facilities would be fed via a dedicated circuit from the step-up substations. From here, power would be delivered to the O&M building.

Operation of the Step-up Substations

The step-up substations would be equipped with night-time and motion sensor lighting systems, as well as emergency lighting with back-up power. Lighting fixtures would be in conformance with the Coconino County lighting ordinance.

Operation of the Communication System

Each turbine would be connected to the SCADA system. The SCADA system would allow for remote control and monitoring of individual turbines and the wind park as a whole from both the central host computer or from a remote computer. The SCADA equipment would be located in the control panel housed inside the base of each WTG. The SCADA system would allow the operator to remotely control and monitor project performance via an internet connection or dedicated high-speed phone line on a continuous basis. Any abnormalities or emergencies detected by the system would initiate a callout sequence, and a maintenance person would be alerted and, if required, dispatched to the WTG immediately to implement corrective action.

Operation of the WTGs

The WTGs would be equipped with sophisticated computer control systems to monitor variables such as wind speed and direction, air and machine temperatures, electrical voltages, currents, vibrations, blade pitch and yaw angles, etc. The main functions of the control system would include nacelle and power operations. Heat dissipation for the operating machinery inside the wind turbines, such as the generator and gearbox, would be achieved with air cooling. Heat dissipation is very minimal.

Aerodynamic brakes and mechanical disk brakes are security measures installed in each WTG. The braking system is designed to be fail-safe, allowing the rotor to shut down during high wind conditions or in less than five seconds in case of electric power failure. Emergency stops are located in the nacelle and in the bottom of the tower. Turbines are also designed to allow for disconnection from all power sources during inspection and maintenance.

Typical chemicals used during operation and maintenance of WTGs include anti-freeze liquid to prevent freezing, gear oil for lubricating the gearbox, hydraulic oil to pitch the blades and operate the brake, grease to lubricate bearings, and various cleaning agents and chemicals for maintenance of the turbine.

Turbines are certified to ISO 14001:20004 for environmental system compliance. All chemicals would be stored and handled in accordance with applicable laws and regulations throughout the construction and operating periods of the wind park.

WTGs would be lighted according to Federal Aviation Administration (FAA) requirements. The FAA has an administrative procedure that provides a Determination of No Hazard with permits for each WTG tower over 200 feet in height. The FAA would provide an approved lighting plan for perimeter WTGs and select internal WTGs for the final project layout, per phase, prior to construction. Typically the FAA requires that approximately one-third of all WTGs in a wind park are lighted. Industry standard lighting is a medium intensity red synchronized flashing light-emitting diode (LED) obstruction light with a horizontal beam pattern.

Operations and Maintenance Building

The O&M facility would include a main building with offices, spare parts storage, restrooms, a shop area, outdoor parking facilities, a turn-around area for larger vehicles, and outdoor lighting. The O&M facility is expected to be fenced. The building would be secured with locking access and service doors, with access limited to authorized personnel. Public access to WTG service roads that connect to the O&M facility would be based on consultation with the private and State landowners.

During operations and maintenance, water to the O&M facility would be expected to be piped from a private on-site well and stored in on-site storage tanks. Domestic sewage would be discharged and treated in an on-site closed septic system. The septic system would be a leach field design, typical to the region and permitted through Coconino County.

Heating for the facility would be determined at the final design stage; electricity, propane or natural gas would be evaluated. If propane or natural gas is selected, storage of this fuel would be addressed in the Spill Prevention, Control, and Countermeasures (SPCC) Plan and other approvals and permitting required for construction, operations, and maintenance of the facility.

Facility exterior lighting would be in conformance with the Coconino County Lighting Ordinance.

Operation of the Meteorological Towers

The wind park design would include up to 16 permanent met towers (for a 500 MW wind park) fitted with multiple sensors to track and monitor wind speed and direction and temperatures. The permanent towers would be connected to the plant's central SCADA system.

These met towers would be lighted according to FAA requirements. Similar to the WTGs, the FAA has an administrative procedure that provides a Determination of No Hazard with permits for each met tower over 200 feet in height. The wind park owner or manager would meet the FAA requirements for lighting.

2.2.1.4 Summary of Wind Park and Ground Disturbance and Reclamation Activities

Table 2.2-4 provides estimates of the extent of temporary and permanent ground disturbance associated with construction, operation, and maintenance of the proposed wind park.

TABLE 2.2-4 ESTIMATED PERMANENT AND TEMPORARY GROUND DISTURBANCE ASSOCIATED WITH A 500 MW WIND PARK						
Facility	**Temporary Ground Disturbance (acres)**			**Permanent Ground Disturbance (acres)**		
	1.5 MW WTG	**1.8 MW WTG**	**3.0 MW WTG**	**1.5 MW WTG**	**1.8 MW WTG**	**3.0 MW WTG**
Project staging/parking area	28–40			24–36		
Borrow pits (to be determined)	2–4			2–4		
Batch plants (2)	0.2			0.2		
Electrical distribution line	61–86			61–86		
Step-up substations (2)	11			7		
O&M building/parking area	2.1			2.1		
Primary access roads	41	35	44	25	22	27
Internal access roads	592	628	382	427	454	276
Wind turbine generators	665–786	553–654	332–392	51	42	25
Collection system/ communication system	712	730	608	0*	0*	0*
Long-term meteorological towers (12)	0.3			0.3		
TOTAL	2,111–2,272	2,047–2,190	1,465–1,567	535–550	552–567	360–375

Source: Foresight Renewables 2011

*Some permanent disturbance is likely in areas where an overhead collection system is constructed. Permanent disturbance would include the foundation and footprint of each structure and would amount to less than one acre total.

Note: Temporary and permanent ground disturbance is not exclusive (i.e., permanent ground disturbance is the same as or part of temporary disturbance).

<u>Reclamation of Disturbed Areas</u>

Following construction, areas not maintained as permanent facilities would be returned to a condition reasonably similar to their pre-construction state. This would include replacing topsoil of the same or similar type and reseeding the affected areas with plant species native to the region. Post-construction re-contouring is not anticipated since excavation activities would be conducted to retain natural contours where feasible.

After construction has been completed, the graveled wind park staging area would be reduced to accommodate permanent parking and other uses near the O&M facility or step-up substations. Excess gravel would be removed and salvaged for resale to other construction projects, or according to landowner desires. The area would be graded and reclaimed as described above.

Resource protection measures are included in Table 2.7-1 to address reclamation of disturbed areas.

2.2.1.5 Wind Park Decommissioning

The design life of major wind park equipment such as the turbines, transformers, substations, and supporting infrastructure is typically considered to be at least 25 years. It is likely that after mechanical wear takes its toll, the wind facilities could be upgraded with more efficient equipment and could have a useful life longer than 25 years. Such upgrades could require additional Federal, State, and local review and approval.

Once it is determined that the wind park would be decommissioned, financial and decommissioning responsibility would rest with the owner or operator of the wind park.   Decommissioning provisions are a typical term in land rights agreements and are expected to be required in jurisdictional permits from the Forest Service (special use permit), ASLD (right-of-way easement), and Coconino County (conditional use permit). Decommissioning provisions include stipulations for post-construction and non-compliance. Foresight also has decommissioning and post-construction reclamation provisions in the land lease agreement with the private landowner that would be implemented per the executed lease per Project phase.

2.2.2 Transmission and Extension Tie-lines

The electricity generated by the wind park would be gathered at the step-up substations located within the wind park study area on private and/or State trust land, where the voltage would be transformed from 34.5 kV to 345 kV. A new 345-kV single-circuit electrical transmission tie-line would be constructed between the wind park step-up substations and Western's existing Glen Canyon-Pinnacle Peak No. 1 and No. 2 345-kV transmission lines. The proposed transmission tie-line would be located on private, State trust, and Forest Service-managed lands.

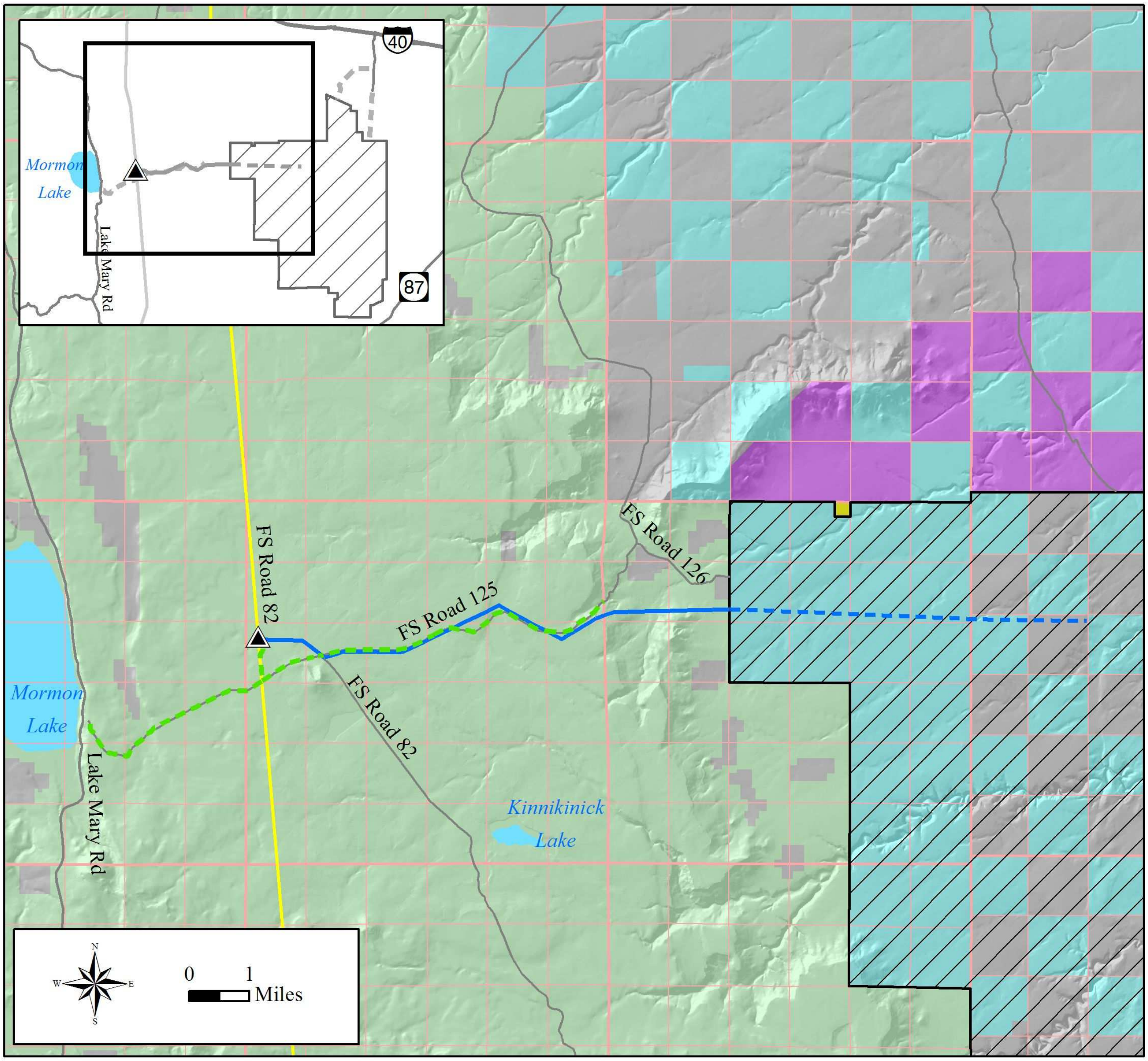
The Glen Canyon-Pinnacle Peak 345-kV transmission lines are part of the regional electrical grid. Connecting into this existing electrical transmission system would allow electricity produced at the wind park to be sold and utilized by Arizona and regional utilities.

The transmission tie-line includes monopole structures, conductors, and associated access roads. The transmission tie-line would be up to approximately 15 miles in length, extending 8.5 miles across Forest Service-managed lands and up to approximately 6.5 miles across State trust and private lands. A 200-foot-wide right-of-way would be acquired for construction, operation, and maintenance of the transmission tie-line for the sections that cross the Forest. General design characteristics of the proposed transmission tie-line are provided in Table 2.2-5 and a location map is provided as Figure 2.2-13. Gray steel monopole structures with non-reflective finishes would be utilized (Figure 2.2-14 is indicative of a typical transmission tie-line structure).

TABLE 2.2-5
TYPICAL 345-kV STRUCTURE CHARACTERISTICS

Feature	Description
Length	Up to approximately 15 miles
Structure height	Approximately 120 feet
Structure diameter	Approximately 7-8 feet
Span length	Approximately 1,000 feet
Right-of-way width	200 feet
Number of structures on Forest Service-managed lands	Approximately 45
Number of structures on State trust or private lands	Up to approximately 35

An extension tie-line approximately seven miles in length ranging between 138-kV and 230-kV would connect the two step-up substations within the wind park (see Figure 2.2-3). Pole structures for the extension tie-line would be 100 to 180 feet in height.



Legend

- Wind Park Study Area
- Proposed 345-kV Tie-line Alignment
- Proposed 345-kV Tie-line Alignment (Alignment to Be Determined)
- Proposed Interconnection Switchyard
- Existing Site Access Road
- Existing Western 345-kV Transmission Lines
- Bureau of Land Management
- Forest Service
- Arizona Game and Fish Department
- Private
- State Trust

Applicant's Proposed 345-kV Tie-line and Western's Proposed Interconnection Switchyard

Grapevine Canyon Wind Project

FIGURE 2.2-13

FIGURE 2.2-14
TYPICAL SINGLE-CIRCUIT 345-kV POLE STRUCTURE

2.2.2.1 Engineering Surveys for the Transmission and Extension Tie-lines

Pre-construction engineering surveys would be conducted to locate the transmission and extension tie-lines rights-of-way, identify property boundaries, provide accurate ground profiles along the transmission and extension tie-line centerlines, locate existing structures, and to determine the locations and rough ground profiles for new service roads. This information would also be utilized to determine the legal descriptions of properties to be used for the transmission tie-line. Soils would be tested to determine physical properties, including the ability to support the proposed structures. A portion of the proposed transmission tie-line would follow an existing cattle trail west out of the proposed wind park to minimize new land disturbance. Affected landowners and land managers would continue to be consulted during the initial route selection and structure siting process to reduce impacts to land uses and avoid or minimize disturbance to sensitive environmental areas.

2.2.2.2 Construction of Transmission and Extension Tie-lines

The construction of the 345-kV transmission tie-line and the extension tie-line would involve many steps, detailed below. Approximately 10 to 30 workers would construct the line over a period of six to ten months. Construction could be paced to accommodate seasonal conditions and to minimize impacts to wildlife.

<u>Tie-line Mobilization and Staging</u>

Three staging areas are planned for the construction of the transmission tie-line, one would be located near the switchyard (on Forest Service-managed lands) and one would be located within the wind park study area near the step-up substation (on private/State trust land). The staging area near the step-up substation would also be used for the extension tie-line. The third staging area would be located at a central point along the transmission tie-line route (on Forest Service-managed lands). Each staging area would be approximately four to six acres in size, located adjacent to the tie-line route. The staging area located near the switchyard could be co-located with the switchyard construction staging area, depending on construction sequencing.

The staging areas would be used for construction safety meetings, to host office trailers, temporary sanitation stations, parking for equipment, vehicle parking for equipment operators and construction workers, and staging for limited project components.

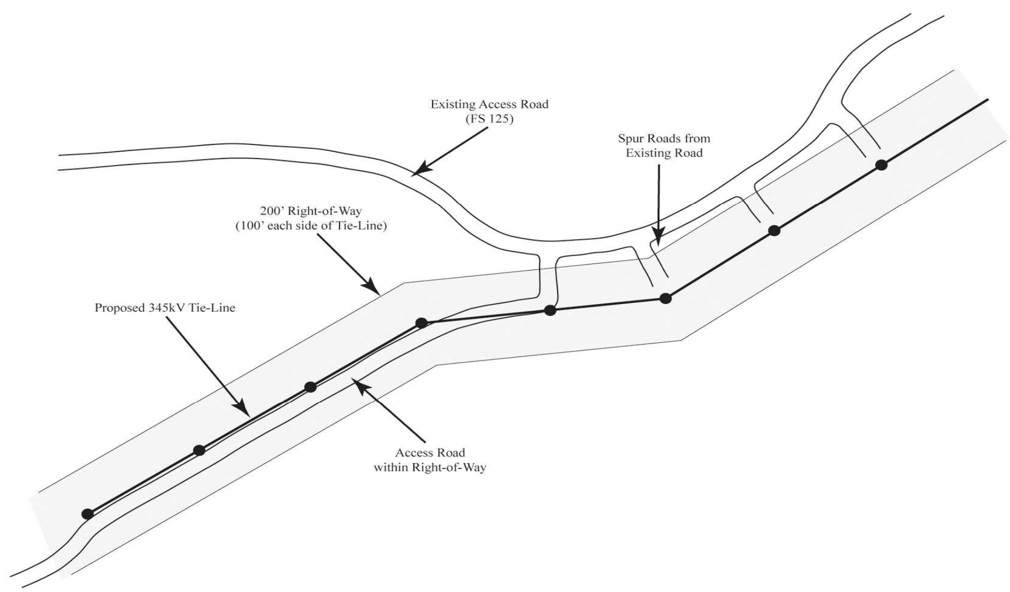
The staging areas would be prepared by clearing and grading as needed. The area would then be covered with four to six inches of gravel to provide a level ground surface. The gravel would be obtained from borrow pits within the wind park study area located on private and/or State trust land. Excess soil material and topsoil salvaged from the site would be used for reclamation of the area after construction or for top-fill in other construction areas. Water or other approved dust suppressant would be used during the grading of the staging area.

Construction of Tie-line Access Roads

Primary construction and maintenance access to the transmission tie-line would be from either Lake Mary Road to Forest Service Route 125 (FS 125) or from the wind park through the primary site access road. Construction access to the extension tie-line would be from the primary site access road. Access to each structure location would be required. In order to minimize ground disturbance, existing roads would be used when possible, with new spur roads constructed to the structure sites. When existing roads are distant from the transmission tie-line, a new access road or spur-road would be established adjacent to the transmission tie-line within the right-of-way. Figure 2.2-15 depicts typical parallel and spur roads access for transmission tie-line construction and maintenance.

The number and location of spur roads and newly constructed access roads would be determined at the time of final transmission tie-line design. Access and spur roads would not be maintained, but would be used regularly to access the transmission tie-line for routine inspections over the lifetime of the project. Typically, the roads would be between 12 and 16 feet in width with a surface that is bladed, compacted, and lightly graveled. Gravel would be sourced from a site approved by the Forest Service, inspected for noxious weeds, and of a color that would match existing roadways and landscapes.

FIGURE 2.2-15
TYPICAL ACCESS ASSOCIATED WITH THE PROPOSED TIE-LINE



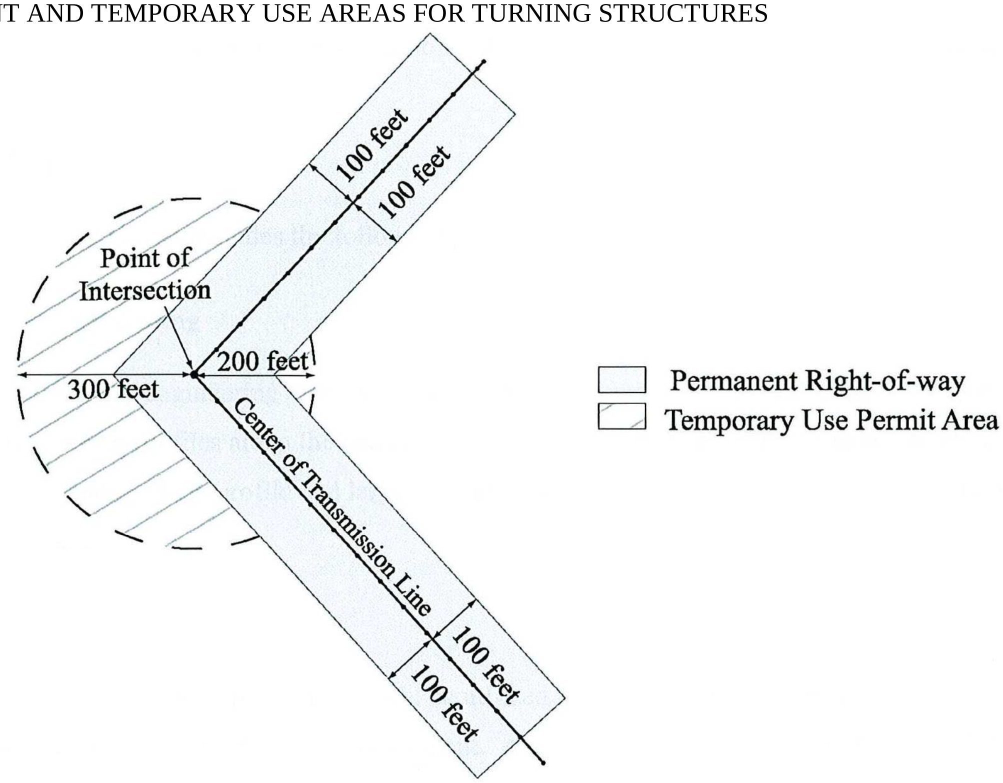
Construction of Tie-line and Temporary Use Areas

A right-of-way, 200 feet in width and extending the length of the transmission tie-line would be required across Forest Service-managed lands and lands managed by the ASLD. The right-of-way would extend 100 feet to either side of the tie-line structures. A portion of the proposed transmission tie-line would follow an existing cattle trail west out of the proposed wind park to minimize new land disturbance. An authorization for the long-term use of existing and newly constructed roadways outside of the right-of-way would be obtained from the Forest Service.

Construction of the transmission tie-line would potentially require temporary construction areas extending outside of the 200-foot-wide right-of-way. If necessary, a temporary use permit for these areas would be obtained from the Forest Service. If additional areas are needed, they would be identified, discussed with the appropriate landowner, and all necessary environmental clearances would be performed. All land rights would be acquired in accordance with applicable laws and regulations governing acquisition of property rights.

Temporary use areas include staging areas, turning structures, and pulling/tensioning sites. Staging areas have been previously described. Pulling/tensioning sites would be located along the transmission tie-line, spaced at 15,000- to 20,000-foot intervals. Each of these sites would be approximately 125 feet by 125 feet. For each turning structure, an area beyond the permanent right-of-way of up to 300 feet on the exterior angle and 200 feet on the interior angle of each turning structure would be required (Figure 2.2-16). Staging areas would be sited to minimize land disturbance for the transmission tie-line construction.

FIGURE 2.2-16
PERMANENT AND TEMPORARY USE AREAS FOR TURNING STRUCTURES



Structure Installation

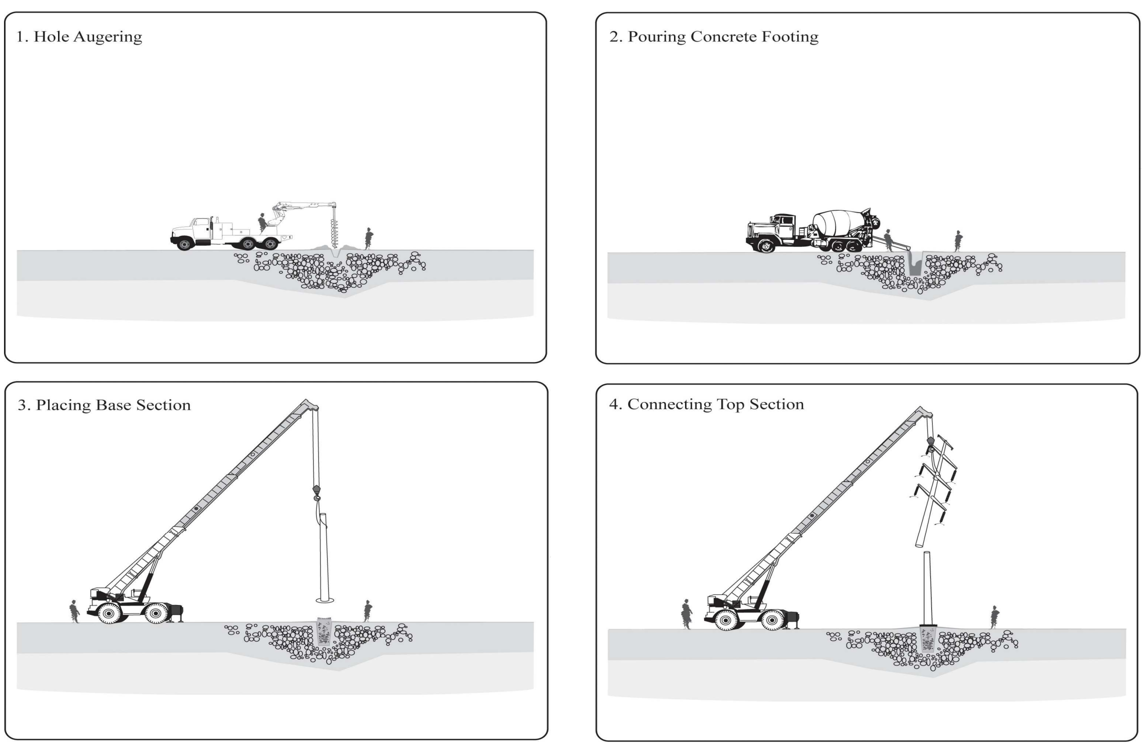
Each structure location would be determined, and access to the site would be constructed as necessary. Structures would generally be spaced 1,000 feet apart; however, this distance could vary depending on topography.

A foundation would be prepared at each structure site. Each foundation would be excavated using a power auger or drill. If rock is encountered, blasting could be required to break up the rock before the hole can be drilled. All safeguards associated with using explosives (e.g., blasting mats) would be employed. Once the hole is bored, a reinforcing steel cage would be inserted, and then the hole would be filled with concrete to form the foundation. Concrete would be sourced from a portable batch plant located within the wind park study area on private and/or State trust land and transported to each foundation location in a ready-mix concrete truck.

Sections of the new monopole structures and associated hardware would then be delivered to each structure site by flatbed truck. Erection crews would use a large crane to position the base section. The base would be secured to the concrete foundation. The remaining sections of the monopole structure would be lifted into place by the crane and secured. Typical steel monopole installation is depicted below in Figure 2.2-17.

While not anticipated at this time, difficult terrain could require that some structures be installed via helicopter.

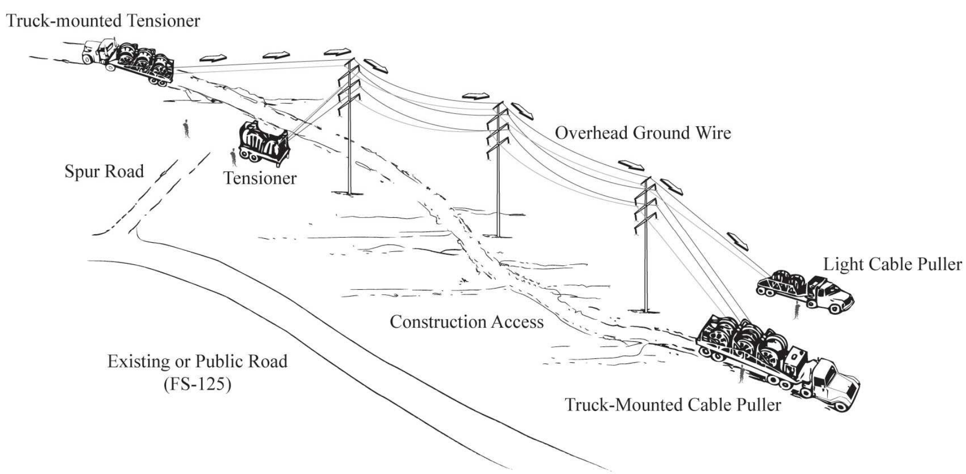
FIGURE 2.2-17
TYPICAL 345-kV STEEL MONOPOLE INSTALLATION



Installation of Conductors, Insulators, Hardware, and Shield Wires

The conductor and ground-wire stringing process is depicted in Figure 2.2-18.

FIGURE 2.2-18
CONDUCTOR AND GROUND WIRE STRINGING ACTIVITIES



Conductor

Conductors would be strung between the structures on the transmission tie-line. Conductor is the wire cable through which the electric current flows. Three conductors would be required to complete a single electrical circuit. Conductors for this project would be steel reinforced aluminum. The aluminum carries most of the electrical current while the steel provides tensile strength to support the aluminum strands. The height of the conductors would be a minimum of 29 feet above the ground, based on standards set forth by the National Electric Safety Code (NESC). The minimum vertical conductor clearances in some instances could be greater in response to logistical requirements or more specific NESC requirements (e.g., sufficient altitude to clear remaining trees).

Once all the structures have been erected, the conductor would be put in place through a process known as “stringing.” Pulling and tensioning sites would be spaced at 15,000- to 20,000-foot intervals and would be located at each end of the transmission tie-line alignment and at turning structures. Stringing equipment at each pulling site would be set up approximately 300 feet from the initial structure. Pulling sites would be about 125 feet by 125 feet, located along the transmission tie-line centerline. Angle structure pulling sites would be located outside the right-of-way because of the need to pull the conductor on a straight line. Reels of conductor and overhead shield wire would be delivered to each of these pulling and tensioning sites. Some earth moving could be needed at pulling and tensioning sites.

Crews would then install insulators and sheaves using a cable truck and a truck with a person lift. Sheaves are rollers attached to the lower end of the insulators at the end of each structure cross-arm. The sheaves allow crews to pull sock lines (rope or wire used to pull power line conductors into place). Once the equipment is set up, a light-weight vehicle would pull the sock line from one structure to the next. At each structure, the sock line would be hoisted to the cross-arm and passed through the sheaves on the ends of the insulators. The sock line would be used to pull the conductor through the sheaves. The conductors would then be attached to the sock line and pulled through each supporting structure under tension. After the conductors are pulled into place, they are pulled to a pre-calculated sag and then tension-clamped to the end of each insulator. Finally, the sheaves are removed and replaced with vibration dampers and accessories.

Insulators and Associated Hardware

Insulators made of an extremely low conducting material, such as porcelain, glass, or polymer, would be used to suspend the conductors from each structure. Insulators inhibit the flow of electrical current from the conductor to the ground, or from one conductor to another conductor. A permanent assembly of insulators would be used to position and support each of the three conductors to the structure. These assemblies are "I"-shaped. The assemblies of insulators are designed to maintain electrical clearances between the conductors, the structure, and the ground.

Overhead Ground Wires (Shield Wires)

To protect conductors from lightning, two overhead ground wires about one-half inch in diameter would be installed on top of the structures. Energy from lightning strikes would be transferred through the ground wires and structures into the ground. One ground wire could also contain fiber optic cable to serve, in part, as a communications system for the project.

2.2.2.3 Operation and Maintenance of the Tie-line

The transmission and extension tie-lines would be operated from a remote power control center. The proposed transmission tie-line system would operate at 345 kV. The amount of power transferred along the conductors would vary depending on seasonal and time-of-day loads, as well as other system demands.

The proposed transmission system would be maintained by monitoring, testing, and repairing equipment. Typical maintenance activities include:

- Periodic routine aerial inspections with emergency aerial inspections after storms, severe wind, lightning, other weather factors, wildfire, or reported vandalism.
- Periodic and emergency ground inspections.
- Routine maintenance to inspect and repair damaged structures, conductors, and insulators.
- Emergency maintenance to immediately repair transmission lines damaged by storms, floods, vandalism, or accidents. Emergency maintenance would involve prompt movement of crews to the site.
- Access road maintenance to regrade and fill gullies, clear and repair culverts, and repair erosion-control features and gates.
- Vegetation management activities would occur approximately every three to five years within the 200-foot-wide right-of-way, consistent with standard practices, and would include cutting, trimming, lopping, and clearing trees, brush, noxious weeds, and undergrowth.

2.2.2.4 Summary of the Tie-line and Ground Disturbance and Reclamation Activities

Table 2.2-6 provides estimates of temporary and permanent ground disturbance associated with construction, operation, and maintenance of the proposed 345-kV transmission tie-line.

TABLE 2.2-6 GROUND DISTURBANCE ESTIMATES FOR TRANSMISSION TIE-LINE		
Facility	**Temporary Ground Disturbance (acres)**	**Permanent Ground Disturbance (acres)**
Mobilization and staging	12–18	0
Access and spur roads	18–24	18–24
Turning structures	24	0*
Structure installation	291–347	1
TOTAL	345–413	19–25
*Permanent disturbance associated with turning structures is incorporated under structure installation.		

Reclamation of Disturbed Areas

A 200-foot right-of-way is generally the area of potential construction disturbance. Additional disturbance would occur within a radius of 150 feet around each structure and within 300 feet of angle structures. Excess soils from structure construction would be spread at the structure location, or if necessary, transported to a suitable off-site disposal location. Temporarily disturbed areas associated with transmission tie-line construction would be reclaimed. These efforts typically include gate repair (if utilized, and as necessary), regrading, revegetation, and waste material removal.

Resource protection measures are included in Table 2.7-1 to address reclamation of disturbed areas.

2.2.2.5 Transmission Tie-line Decommissioning

Once the wind park has reached the end of its useful life and is decommissioned, it is likely that the transmission tie-line would also be decommissioned. Decommissioning provisions are a typical term in land rights agreements and are expected to be required in jurisdictional permits from the Forest Service (special use permit), ASLD (right-of-way easement), and Coconino County (conditional use permit). Decommissioning provisions include stipulations for post-construction and non-compliance. Foresight also has decommissioning and post-construction reclamation provisions in the land lease agreement with the private landowner that would be implemented per the executed lease per Project phase.

2.2.3 Western's Switchyard

Western's proposed 345-kV interconnection switchyard would be located entirely on Forest Service-managed lands about three-quarter mile north of FS 125 and generally within the rights-of-way of Western's two 345-kV transmission lines (Figure 2.2-19). The switchyard is expected to be approximately 650 feet wide by 1,000 feet long. The switchyard facilities would be constructed, owned, and operated by Western. There would be no additional transmission facilities required to interconnect the Applicant's 500 MW generating facility to Western's transmission facilities.

FIGURE 2.2-19
WESTERN'S PROPOSED SWITCHYARD LOCATION

In general, switchyards contain electrical equipment that enables a utility to interconnect different transmission lines, disconnect lines for maintenance or outage conditions, and regulate voltage. The switchyard for this project would contain power circuit breakers, disconnect switches, steel busses, steel poles, cables, metering equipment, communication equipment, AC/DC batteries, and other equipment. A breaker is a switching device that can automatically interrupt power flow on a transmission line at the time of a fault, such as a lightning strike, trees or tree limbs falling on a line, or other unusual event. Disconnect switches are used to mechanically or electrically disconnect or isolate equipment. Switches are normally located on both sides of circuit breakers. Power moves within the switchyard and between breakers and other equipment on rigid aluminum pipes called bus tubing. This tubing is supported and vertically elevated by pedestals called bus pedestals. Figure 2.2-20 depicts a typical 345-kV switchyard.

The proposed switchyard would include several bays. Eight 345-kV power circuit breakers would be installed within the switchyard and used to automatically interrupt power flow on the transmission tie-line at the time of a fault. One bay within the switchyard would accommodate the wind generating facility. Another bay would include three 345-kV gas-filled breakers that would connect the proposed wind generating facility to the grid. Other bays would accommodate the Glen Canyon-Pinnacle Peak No. 1 and No. 2 transmission lines.

In addition, an oil-filled 10-megavolt amphere (MVA) 345/34.5-kV transformer to three (3) 34.5-kV underground conductors to serve an 150-kilovolt amphere (KVA) 277/480 volt transformer would be installed within the switchyard to provide station electrical service, since station service is unavailable from other sources. During the design of the switchyard, a determination would be made on the need for secondary containment per Clean Water Act requirements. If required, secondary containment would be installed within the substation to prevent the migration of oil from the substation site. Backup station service would be provided by an on-site generator located within the substation.

FIGURE 2.2-20
TYPICAL 345-kV SWITCHYARD

2.2.3.1 Engineering Surveys for the Switchyard

Pre-construction aerial and/or ground surveys would locate the switchyard property lines and corners, provide accurate ground profiles, locate structures, and determine the exact locations and rough ground profiles for new access roads. This information would help complete legal descriptions of properties to be used for the switchyard. Soils would be tested to determine physical properties, including the ability to support the proposed structures.

2.2.3.2 Construction of the Switchyard

The 345-kV switchyard would temporarily require about 24 acres during construction and 15 acres permanently. Construction of the switchyard would take place in approximately seven months over a two year period, depending on weather and outages required on the Western/Colorado River Storage Project system and following equipment procurement and delivery. Construction would be completed by approximately 20 to 30 workers on-site at any given stage of the construction process. Construction vehicles and equipment that would be needed for the construction of the switchyard include large cranes, heavy backhoe and earthmovers, large forklifts, and various power tools. Access roads would be constructed using typical road construction equipment, including a bulldozer, grader, front-end loader, and excavator.

Construction of the switchyard and interconnection facilities would involve several stages of work including access road construction and/or improvement; grading of the switchyard area; construction of foundations for transformers, steel work, breakers, control houses, and other outdoor equipment.

Switchyard Mobilization and Staging

A temporary staging area would be developed on approximately three to four acres adjacent to the switchyard site. The staging area would be used for construction safety meetings, to host office trailers, temporary sanitation stations, parking for equipment, vehicle parking for equipment operators and construction workers, and staging for limited project components.

The staging area would be prepared by clearing and grading as needed. The area would then be covered with four to six inches of gravel to provide a level ground surface. The gravel would be obtained from an outside contractor and trucking companies and would be certified weed free. Excess spoil material and topsoil salvaged from the site would be used for reclamation of the area after construction or for top-fill in other construction areas. Water or other approved dust suppressant would be used during the grading of the staging area.

Construction of Switchyard Access Roads

Primary construction and maintenance access to the switchyard site would come from Lake Mary Road to FS 125. A short piece of a paved segment of FS 125 could need to be modified within the existing road area to reduce the grade at a high point to facilitate passage of large equipment. From FS 125, the switchyard would be accessed via Western's current easement. An existing access road within this easement would be improved to allow movement of construction vehicles.

Improvements to Western's existing access road would involve vegetation clearing, excavating current groundcover to a depth of up to 12 inches, and placing approximately 4 to 6 inches of aggregate from off-site sources or the borrow pits located in the wind park study area. The road surface would then be graded and compacted. Berms and other drainage features would be constructed as required. Topsoil removed during road construction would be used for top fill, or stockpiled for berms and other drainage features.

Switchyard Site Grading and Preparation

The 15-acre site would be cleared and leveled with a grader and backhoe. The area would then be covered with about 6 inches of aggregate. Western would require its construction contractor to comply with federal, state, and local noxious weed control regulations, including a clean vehicle policy, while entering and leaving the switchyard construction site. The construction contract would give the contractor detailed information on ground cover for the switchyard. The primary purpose of the aggregate is to provide insulating properties to protect operation and maintenance personnel from electrical danger. Water or other approved dust suppressant would be used during the clearing and grading of the switchyard site. Less than ten acre-feet of water would be required at the switchyard site.

Installation of Components

Concrete footers and foundations would be poured for the bus work and control building. The concrete would come from an outside contractor. Transformers, breakers, control houses, and other outdoor equipment would be transported to the site for installation. Lastly, steel work and electrical work for all of the required terminations would occur.

Communication Facilities

Western requires dual and redundant communication with its switchyards. A microwave communication tower would be installed within the new switchyard to deliver signals to operate switchyard equipment from control centers and other remote locations and to report metering. The microwave system would also provide voice communication from dispatchers to maintenance personnel. New communication equipment would be installed at the switchyard. Microwave communications require an unobstructed "line of sight" between antennas. A tower approximately 60 feet high would be constructed at the switchyard with a microwave antenna aimed toward an existing communication link on Mount Elden, approximately 25 miles northwest of the proposed switchyard site.

A second communication system would be provided by radio.

2.2.3.3 Construction of the Transmission Interconnection

Western would install four new in-lead dead-end structures to provide a tie with the new switchyard and the existing Glen Canyon-Pinnacle Peak transmission lines. Each dead-end structure would be a heavy duty galvanized steel monopole structure and provide a tie into the new switchyard. It is envisioned that the new structures would be located on Forest Service-managed lands within the existing Glen Canyon-Pinnacle Peak transmission lines rights-of-way in the span between four existing towers near the proposed switchyard site. Also, depending on design considerations, existing structures near the new switchyard site could need to be modified to accommodate the interconnection. Once the new dead-end structures are installed, and upon completion of the new switchyard, the existing Glen Canyon-Pinnacle Peak transmission lines' conductors in the span above the switchyard would be cut and attached to the new dead-end structures. New conductors would be installed from the new dead-end structures to A-frame tubular steel take-off structures within the switchyard then on the bus tubing within the switchyard.

2.2.3.4 Operations and Maintenance of the Switchyard

<u>Switchyard Start-Up</u>

Switchyard start-up would follow a detailed plan for testing and energizing the step-up substations, transmission tie-line, and interconnection switchyard in a defined sequence with lock and tags on breakers to ensure safety and allow for fault detection prior to energizing any component of the system. Switchyard start-up would not require any heavy machinery to complete.

<u>Operation and Maintenance Activities</u>

During operation of the new switchyard, authorized Western personnel would conduct periodic inspections and service equipment as needed. Properly trained maintenance personnel would monitor and manage the use, storage, and replacement of gas-filled breakers to minimize any releases to the environment. During inspections, equipment would be monitored for detection of leaks and repairs would be made as appropriate.

The switchyard would be designed to operate from a remote location, and no permanent employees would be required.

<u>Operation and Maintenance Access</u>

Access to the switchyard for both construction and operation and maintenance would be from the existing access road associated with the Glen Canyon-Pinnacle Peak 345-kV transmission lines. This access road could be improved, but would remain open. Gates would be located at the entrance to the switchyard.

<u>Communication Facilities</u>

Communication facilities would be inspected and serviced as needed by authorized Western personnel.

2.2.3.5 Summary of the Switchyard and Ground Disturbance and Reclamation Activities

Temporary and permanent ground disturbance estimates from construction, operations, and maintenance of the switchyard are provided in Table 2.2-7.

TABLE 2.2-7 PERMANENT AND TEMPORARY GROUND DISTURBANCE ASSOCIATED WITH THE SWITCHYARD		
Facility	**Temporary Ground Disturbance (acres)**	**Permanent Ground Disturbance (acres)**
Staging area	3	0
Access roads	2	2
Switchyard	15	15
In-lead Dead-end Structures	4	0
TOTAL	24	17

2.2.3.6 Switchyard Decommissioning

Decommissioning provisions are a typical term in land rights agreements and are expected to be included in the final Forest Service special use permit for Western's switchyard. If the wind park facility is decommissioned, Western may not decommission the switchyard since its addition would enhance transmission operations. If decommissioned, the proposed switchyard would be in compliance with Forest Service special use permit provisions for decommissioning.

2.3 ALTERNATIVE TRANSMISSION TIE-LINE CORRIDOR

Foresight, in coordination with the Forest Service, has proposed a route for the transmission tie-line as discussed in Section 2.2.2. The Forest Service has also identified an alternative route for the transmission tie-line to differently address potential effects to visual resources. Both the proposed route and alternative route were evaluated to address potential effects to visual resources and avoid or minimize impacts to other resources. As with the proposed transmission tie-line, a portion of the alternative transmission tie-line would follow an existing cattle trail west out of the wind park to the top of Anderson Mesa. The proposed and alternative transmission tie-line would then parallel FS 125 west to a point approximately one-third mile east of the intersection of FS 9483g. At this point, the alternative transmission tie-line corridor would then proceed north approximately one-quarter mile before veering to the west into the interconnection switchyard (Figure 2.3-1). The wind park and interconnection switchyard would be located in the same location and constructed in the same manner as described under Foresight's Proposed Project in Section 2.2.

Similar to the transmission tie-line included in Foresight's Proposed Project (Section 2.2.2), the alternative transmission tie-line would require approximately 80 structures and would be approximately 15 miles long, extending 8.5 miles across Forest Service-managed lands and 6.5 miles across State trust and private lands. The alternative action would result in slightly more ground disturbance than the transmission tie-line associated with Foresight's Proposed Project because it uses less existing roads. Ground disturbance for the alternative action is estimated to be 346–414 acres of temporary disturbance (approximately one acre more than Foresight's Proposed Project transmission tie-line) and 20–26 acres of permanent disturbance (approximately one acre more than Foresight's Proposed Project transmission tie-line).

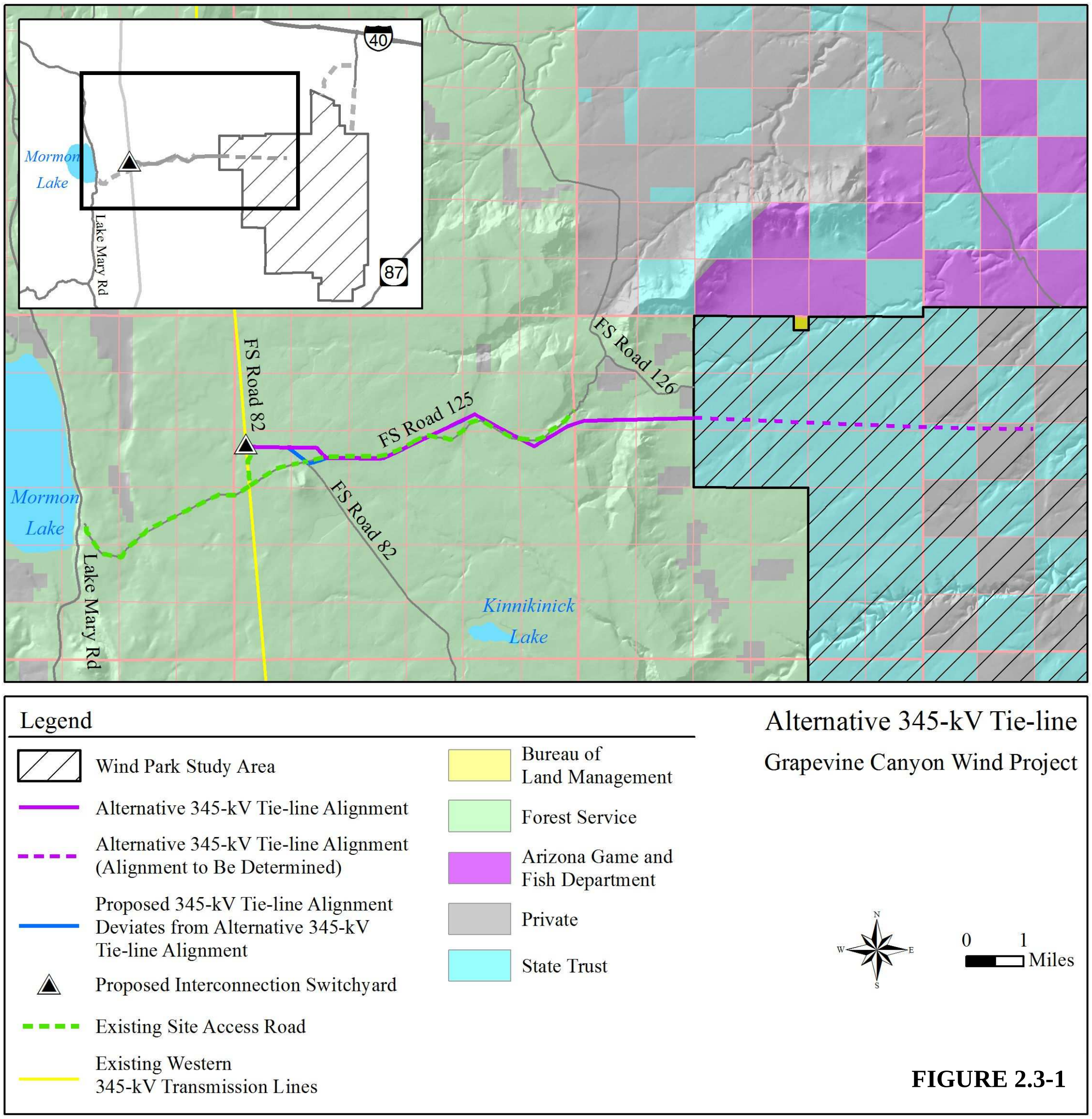


FIGURE 2.3-1

2.4 NO ACTION ALTERNATIVE

Under the No Action Alternative, Western would deny the interconnection request and the Forest Service would not permit facilities to be placed on Forest Service-managed lands. For the purpose of impact analysis and comparison in this Final EIS, it assumed that the proposed wind park would not be built and the environmental impacts, both positive and negative, associated with construction and operation would not occur.

2.5 COMPARISON OF ALTERNATIVES

TABLE 2.5-1
COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES

Resource	**Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard**	**Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard**	**No Action Alternative**
Land Use	Development of the up to 500 MW wind project would result in a permanent conversion of 591–627 acres of land from grazing to other use. Approximately 97 percent of the wind park site area would remain available for grazing per phase.	Development of the up to 500 MW wind project would result in a permanent conversion of 592–628 acres of land from grazing to other use, slightly more than under the proposed wind park, tie-line, and Western's proposed switchyard. Impacts would not be noticeably different than those described under the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would result in no change to existing land uses.
Biological Resources	Construction of the wind park is expected to temporarily disturb 2,050–2,193 acres and permanently disturb 555–570 acres of scrub-shrub, grassland, and a small amount (less than 2 percent) of evergreen forest. Construction of the transmission tie-line and switchyard is expected to temporarily disturb 345–413 acres and permanently disturb 19–25 acres of grassland, pinyon-juniper woodland, and a small amount (less than 3 percent) of ponderosa pine forest. Landcover types and habitats found within the wind park study area and adjacent to the transmission tie-line and switchyard are not unique to the surrounding landscape or region.	Construction of the wind park is expected to temporarily disturb 2,050–2,193 acres and permanently disturb 555–570 acres of scrub-shrub, grassland, and a small amount (less than 2 percent) of evergreen forest. Construction of the alternative tie-line and switchyard is expected to temporarily disturb 346–414 acres (approximately 1 acre more than Foresight's proposed transmission tie-line alignment) and 20–26 acres of permanent disturbance (less than 1 acre more than Foresight's proposed tie-line alignment). The alternative tie-line route would affect open grassland. Impacts to special status species; birds, raptors, and bats; and big game would not be noticeably different than those under the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect to biological resources.

TABLE 2.5-1 COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES			
Resource	**Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard**	**Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard**	**No Action Alternative**
Biological Resources (continued)	Special status plant species have highly restricted distributions and very specific habitat requirements and are not expected to occur within the wind park study area based on either an absence of habitat, range, or distribution. Canyon bottoms containing riparian areas, deciduous woodlands, wetlands, or waterbodies may support wetland and mesic plant species would be mostly avoided by wind park facilities. Federally-listed Mexican spotted owls are known to occur in the Forest in the vicinity of the transmission tie-line, and while the species move through the area, suitable nesting habitat is not present within or immediately adjacent to the proposed transmission tie-line evaluation area. The USFWS provided comments to the Draft EIS stating that the Federally-listed Mexican gartersnake and Chricahua leopard frog are not believed to occur or be affected by the project. Implementation of these RPMs during construction and operation of the wind park facilities would minimize impacts to these species. Construction and operation of the proposed project may result in direct impacts to the birds, raptors, and bats through collision and/or electrocution with the wind turbines and power lines. RPMs include additional pre-construction surveys, preparation of an ABPP, constructing outside of bird nesting season or nest area avoidance, adherence to the Avian Power Line Interaction Committee suggested practices for avian protection on power lines, and formal post-construction monitoring study designed to estimate and address avian and bat mortality.		

TABLE 2.5-1 COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES			
Resource	**Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard**	**Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard**	**No Action Alternative**
Biological Resources (continued)	Construction activities may cause short-term impacts to big game such as antelope, mule deer, and elk populations. Big game behavior and movement throughout the area of potential disturbance may be affected, but operation of project facilities is not expected to have long-term impacts on big game behavior or movement patterns. Population trends and habitat viability associated with these species would not be impacted by construction and operation of the wind park, transmission tie-line, and switchyard.		
Cultural Resources	Would directly disturb between 2,419–2,630 acres of land within areas known to have been used prehistorically and historically. Research identified 678 previously recorded cultural resources within the cultural resources evaluation area for the proposed project facilities. Twenty-four of the sites potentially occur within 100 feet of the wind park study area, transmission tie-line, and/or switchyard. Of the 24 sites identified during the background research, 4 of these are recommended as eligible for listing on the NRHP. The preliminary layout plan for the primary access road was prepared to avoid impact to these sites. Western would consult with the signatories to the PA to determine the NRHP eligibility for 12 newly recorded sites and seven rock cairns based on the Class III pedestrian surveys completed for the proposed project. Of the 12 newly recorded sites, 9 are associated with the proposed transmission tie-line and 3 sites and rock cairns are associated with the proposed primary site access road. The preliminary layout plan for the proposed access road was prepared to avoid impacts to those sites and rock cairns.	Would directly disturb between 2,420–2,631 acres of land within areas known to have been used prehistorically and historically, slightly more than the proposed wind park, transmission tie-line, and Western's proposed switchyard. Impacts would not be noticeably different than those under the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on cultural resources.

TABLE 2.5-1 COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES			
Resource	**Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard**	**Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard**	**No Action Alternative**
Cultural Resources (continued)	The development of wind park and transmission tie-line facilities may also indirectly impact areas of interest to Native Americans such as sacred areas, or areas used for collecting traditional resources such as birds and medicinal plants. Visual impacts on significant cultural resources such as sacred landscapes, historic trails, and viewsheds from other types of historic properties (e.g., homes and bridges) may also occur. In addition, there may be visual impacts on TCPs because the visible wind turbines may be perceived as an intrusion on a sacred or historic landscape that could result in a significant adverse effect to these TCPs.		
Geology and Soils	Would temporarily disturb between 2,419–2,630 acres of land and would permanently remove vegetation from and alter the surface of 591–627 acres of land. This would result in increased erosion and the permanent loss of soils.	Would temporarily disturb between 2,420–2,631 acres of land and would permanently remove vegetation from and alter the surface of 592–628 acres of land. Impacts would be slightly greater than those described under the proposed wind park, transmission tie-line, and Western's proposed switchyard because the transmission tie-line associated with the alternative action requires a new access road across moderately erosive soils that are difficult to revegetate.	Would have no effect on geology and soils.
Air Quality	Air quality impacts would be minimal, generally resulting from emissions and fugitive dust from equipment and vehicle operations during construction. Air quality impacts would be greatest during the construction period with fugitive dust emissions primarily from earthmoving, construction vehicle exhaust emission, and fugitive and point sources associated with the concrete batch plant. Operational impacts would be minimal because WTGs do not have emissions. There are emissions and dust associated with maintenance vehicle traffic. RPMs have been identified to further reduce the effects to air quality and there would be no measurable impact.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on air quality.

TABLE 2.5-1 COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES			
Resource	**Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard**	**Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard**	**No Action Alternative**
Water Resources	Construction would require approximately 307 acre-feet of groundwater if the wind park is built out to 500 MW. Operations would require a negligible amount of water. Soil erosion and sedimentation would increase as a result of the temporary disturbance of between 2,419–2,630 acres of land as would the permanent disturbance and removal of vegetation from 591–627 acres of land. Potential impacts to waters of the U.S. or wetlands identified by the Forest Service could result from construction, operation, and maintenance of the proposed wind park and transmission tie-line. Potential impacts include placement of fill or removal of materials and vegetation; altered flows or sediment transport; spills of contaminating materials; increased scour and erosion downstream; and construction of diversions, culverts, and below grade utility structures.	Construction and operations would require the same amount of water as the proposed wind park, transmission tie-line, and Western's proposed switchyard. Between 2,420–2,631 acres of land would be disturbed temporarily and 592–628 acres of land would be permanently disturbed resulting in erosion and sedimentation. Impacts to preliminary jurisdictional washes would not be noticeably different than those described under the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on water resources.
Water Resources (continued)	Approximately 262 miles of potential jurisdictional waters have been observed in the up to 500 MW wind project study area. The impact of the initial phase is expected to affect approximately one-half acre for the initial phase study area, subject to USACE determination. Preliminarily, a similar impact for the build-out phase(s) study area in anticipated, also subject to USACE determination. It is expected through avoidance of features identified as jurisdictional waters of the U.S. to the extent practicable and through implementation of RPMs and other best management practices, to reduce impacts to jurisdictional features to the least environmentally damaging approach that can be achieved as required through the Clean Water Act Section 404 permitting process.		

TABLE 2.5-1 COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES			
Resource	**Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard**	**Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard**	**No Action Alternative**
Socioeconomics	Would result in the employment of approximately 400 workers directly, or through local or regional construction and service contract firms, during construction and between 17–40 workers during regular operations for a typical 500 MW wind park. This would lead to a slightly greater demand on public facilities, including schools. Vacancy rates in housing units in the region suggest capacity is available for this level of employment. In addition, the project would create a supplemental source of revenue to ranchers and State trust land beneficiaries and provide new tax revenues to the County and State.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would not realize the economic objectives of the Diablo Canyon Rural Planning Area since no similar economic development proposals are currently under consideration.
Environmental Justice	Would result in additional employment opportunities and tax revenue that would benefit directly or indirectly persons living below the Federal poverty level.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on environmental justice, beneficial or otherwise.
Transportation	Would result in a short-term (12–18 months per wind park phase) increase in construction related traffic of over 400 two-way vehicle trips each day during peak construction activity on I-40 and Meteor Crater Road and approximately 25 two-way vehicle trips each day on Lake Mary Road and FS 125. It would result in a minimal long-term increase in vehicular traffic on I-40 and Meteor Crater Road. Impacts would be proportionally reduced for project phases.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard. Impacts would be proportionally reduced for project phases.	Would have no effect on transportation.
Health, Safety, and Security	Would create minimal occupational hazards, public safety, and environmental hazards during construction and operations.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on health and safety.
Noise	Construction equipment would elevate ambient noise levels substantially over the short-term (12–18 months per wind park phase) during certain construction activities, but operations would result in a minimal increase in ambient noise levels that would dissipate over a short distance.	Would be the same as the proposed wind park, transmission tie-line, and Western's proposed switchyard.	Would have no effect on noise.

TABLE 2.5-1 COMPARISON OF EFFECTS TO RESOURCES FOR ALTERNATIVES			
Resource	**Proposed Wind Park (500 MW), Transmission Tie-line, and Western's Proposed Switchyard**	**Proposed Wind Park (500 MW), Alternative Transmission Tie-line Corridor, and Western's Proposed Switchyard**	**No Action Alternative**
Visual Resources	Would result in a visual contrast by introducing contrasting elements of form, line, and color. In addition, the proposed transmission tie-line would result in a Visual Quality Objective of Modification within an area on Forest System-managed lands for a Visual Quality Objective of Partial Retention.	Effects would generally be the same as those described under proposed wind park, transmission tie-line, and Western's proposed switchyard except the tie-line would be routed to avoid the more sensitive area (Partial Retention) on Forest System-managed lands.	Would have no effect on visual resources.

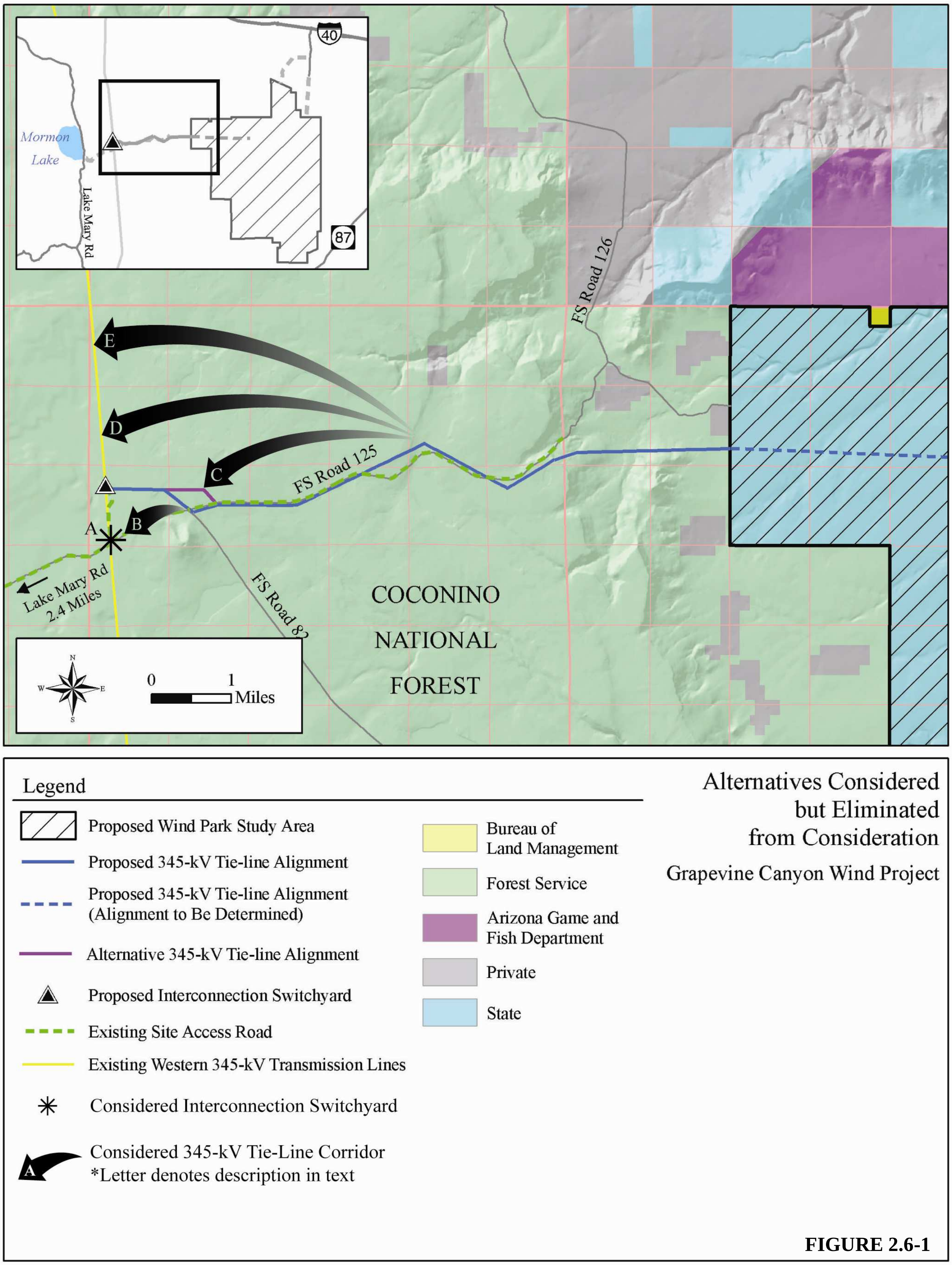
2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM CONSIDERATION

Several alternatives to the location and/or design of the proposed project elements on Federal land were considered during development of this project. An alternative was not carried forward for full analysis if there were issues with cost, construction feasibility, environmental resource sensitivities, and conformance with applicable land use plans. Based on these criteria, a number of alternatives were not carried forward for further consideration as described in Table 2.6-1 along with rationale for their elimination and are roughly depicted on Figure 2.6-1. Alternatives addressing the location of the proposed wind park were not evaluated since no alternative locations were proposed during the EIS scoping process, and decisions and actions related to the proposed wind park are outside of the decisions that would be made by Western and the Forest Service. The wind project location was selected for its proximity to the interconnection location and screening factors as noted in Section 2.2 above.

Comments on the Draft EIS were received that suggested expanding the alternatives analysis in the Final EIS to include either alternate site locations or on-site alternatives that demonstrate a reduction of impacts, and an alternative that defines the project area as Study Area A and eliminates Study Areas B and C. Western considered the alternatives suggested to Foresight's proposed wind park and has determined that the EIS will not fully analyze them because Western's decision is limited to whether to grant the interconnections at the proposed switchyard.

TABLE 2.6-1 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM CONSIDERATION		
Alternative Description	**Rationale for Elimination**	**Figure 2.6-1 Location**
Bury the transmission tie-line underground.	High costs for installation and repair, 2–4 times more expensive than overhead lines; adds considerable time for maintenance and repair. There would be more temporary land disturbance and environmental impacts versus overland structure placement as proposed.	—
Locate the interconnection switchyard at the intersection of FS 125 and the Western 345-kV transmission lines.	Would not provide a direct line of site to a communications tower atop Mt. Elden; would be located within an area managed by the Forest Service as Partial Retention for visual resources, and would require a Forest Plan amendment.	A

TABLE 2.6-1 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM CONSIDERATION		
Alternative Description	**Rationale for Elimination**	**Figure 2.6-1 Location**
Site the transmission tie-line adjacent to FS 125 from the top of Anderson Mesa to the Western 345-kV transmission lines.	This site is located within an area managed for visual resources and would require a Forest Plan amendment.	B
Site the transmission tie-line approximately one-quarter mile north of FS 125.	Would be located within the foreground viewshed of FS 125 towards the San Francisco Peaks.	C
Site the transmission tie-line approximately one mile north of FS 125.	Would be located within the middleground viewshed of FS 125 towards the San Francisco Peaks; would be located within a prairie dog town.	D
Site the transmission tie-line approximately two miles north of FS 125.	Would be a considerably longer route affecting more wildlife habitat, including a prairie dog town and an area actively managed for pronghorn antelope.	E



Alternatives Considered but Eliminated from Consideration

FIGURE 2.6-1

2.7 FORESIGHT AND AGENCY RESOURCE PROTECTION MEASURES

Foresight and agencies have proposed RPMs by resource area for the proposed project and proposed Federal actions to minimize impacts associated with construction, operation, and maintenance. Foresight and agencies have committed to these RPMs, and they are included in the evaluation of environmental impacts. Western and the Forest Service do not have jurisdiction over the siting, construction, or operation of the proposed wind park, so their proposed measures only apply to the proposed switchyard (Western) and the proposed switchyard and transmission tie-line (Forest Service). Western, Forest Service, and Foresight are signatories on the PA for compliance with the National Historic Preservation Act (NHPA), and thus would abide by the provisions in the PA addressing effects to properties on or eligible for listing to the National Register of Historic Places (NRHP).

Foresight would follow standard construction practices, Best Management Practices (BMPs), and RPMs during the construction, operation, and maintenance of the proposed wind park and transmission tie-line facilities. These measures could be imposed by State, local, or other jurisdictions as the result of approvals for storm water management, grading permits, building permits, etc., or would be implemented based on Foresight's construction practices. Some RPMs have been designed to address direct and indirect impacts to birds and bats during construction and operation based on additional impact assessments and data acquired during actual construction and operation. To implement the RPMs, an Avian and Bat Protection Plan (ABPP) is being voluntarily developed with USFWS and Arizona Game and Fish Department (AGFD). The ABPP includes components such as additional pre-construction wildlife studies to inform final micro-siting of the initial project phase, post-construction wildlife studies and monitoring operational impact levels that are based on the Wind Turbine Guidelines Advisory Committee (WTAC) Tier 4 framework (USFWS 2010). An Adaptive Management protocol would be implemented within the ABPP whereby iterative decision-making (evaluating results and adjusting actions on the basis of what has been learned) would be undertaken to reduce or avoid impacts to biological resources. Operational practices could be refined based upon observed impacts which have been documented as occurring at the project. Data collected during monitoring studies or facility operation would be used to help inform operational practices in addition to consultation with wildlife or biological experts, consultants, agency personnel, landowners and other stakeholders.

The Forest Service has proposed certain measures that would be binding on Foresight for the proposed transmission tie-line and on Western for its proposed switchyard, if adopted by the Forest Service. In addition, Western requires its construction contractors to implement standard environmental protection provisions. These provisions are provided in Western's Construction Standard 13 (Appendix A) and would be applied to the proposed switchyard. Specific BMPs that the Forest would require for soil and water resources for the proposed transmission tie-line and switchyard, as well as invasive species management, are found in Appendix C. Table 2.7-1 below summarizes Foresight's and agency's RPMs as would be applied to the proposed project components.

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
LAND USE			
Foresight would work closely with landowners and state and Federal land managers to site access roads to minimize land-use disruptions to the extent possible. Infrastructure and roads shown in the preliminary layout plan have been minimized to reduce fragmentation of the landscape and impacts to native habitats to the extent possible. Wherever possible, existing roads have been, and would be, utilized during facility design. The transmission tie-line route utilizes existing disturbed areas to minimize fragmentation and the extent of vegetation removal necessary.	X		
Prior to construction, Foresight would prepare a Hunter Education and Access Plan in coordination with AGFD. The Plan would provide for public notice regarding construction activities and timeline, written notice to pronghorn and elk hunting permittees for Unit B, and a sign-in kiosk at public access points to the construction project.	X		
In the event of unexpected property damage caused by the activities during project construction, Foresight, Forest Service, or appropriate authority would quickly investigate and reasonably attempt settlement with the party who incurred property damages.	X		X
Concrete wastes shall not be disposed of on any Western property, right-of-way, or easement or on any streets, roads, or property without the owner's or land management agency's consent.		X	

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
BIOLOGICAL RESOURCES			
Special status species including Federally-listed threatened and endangered or candidate species, USFWS birds of conservation concern, Arizona Partners in Flight Priority Species or State wildlife species of special concern would continue to be considered during post-EIS phases of the proposed project's development following permit conditions set forth by the appropriate land or resource managing agency. This could entail conducting pre-construction surveys for aforementioned special status species along access and spur roads, staging areas, and construction sites as agreed upon by the land or resource managing agency. Additional pre-construction clearance surveys are being conducted, or are planned, for sensitive biological resources in consultation with USFWS and AGFD. In cases where such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat and could include, but is not limited to, mitigation or altering the placement of roads or structures as practical and monitoring construction activities. Any further measures to implement these RPMs would be planned in consultation with the USFWS and AGFD. Information collected during post-construction studies for the initial phase would also help to inform siting of subsequent phases and would be reported as part of the ABPP being voluntarily developed for the wind park in consultation with the USFWS and AGFD.	X		X
Prior to the start of switchyard construction, Western would provide training to all contractor and subcontractor personnel and others involved in the construction activity in the identification of any Federally-listed threatened, endangered or candidate species, which for this project includes the Federally threatened Mexican spotted owl. Untrained personnel shall not be allowed in the construction area. Western would provide drawings or maps showing sensitive areas located on or immediately adjacent to the transmission tie-line right-of-way and/or facility. These sensitive areas shall be considered avoidance areas. Prior to any construction activity, the avoidance areas shall be marked on the ground (no paint or permanent discoloring agent would be used) by Western. If access is absolutely necessary, the contractor shall first obtain written permission from Western, noting that a Western and/or another Federal biologist could be required to accompany personnel and equipment. Ground markings shall be maintained through the duration of the contract. Western would remove the markings during or following final inspection of the project.		X	

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
Prior to the start of wind park and/or transmission tie-line construction, Foresight would provide training to all contractor and subcontractor personnel and others involved in construction activities in the identification of Federally-listed threatened and endangered or candidate species, USFWS birds of conservation concern, Arizona Partners in Flight Priority Species, or State wildlife species of special concern with the potential to occur in the wind park and transmission tie-line.	X		
Clearing activities associated with construction would occur outside of the bird nesting season to the extent practical in order to reduce impacts to breeding birds and their habitats to the extent possible and comply with the MBTA and other Federal and State laws. Should habitat clearance activities be required during the nesting season—defined as March through September—vegetation clearing activities would include pre-construction clearance surveys and/or biological monitoring by a qualified wildlife biologist. If an active nest for a Federally-listed threatened and endangered or candidate species, USFWS birds of conservation concern, Arizona Partners in Flight Priority Species, or State wildlife species of special concern is found in the project area during construction activities, Foresight would immediately notify AGFD and USFWS and provide the location and nature of the findings. Foresight's contractor would stop all activity within 200 feet of the protected species or habitat while conferring with the appropriate wildlife agency. The Forest Service would also be notified of the finding if on Forest Service-managed lands.	X	X	X
In order to avoid or minimize risk of destruction of bat roost sites during the maternity season, clearing activities resulting in the destruction of snags suitable for roosting bats would be conducted to the extent possible outside the bat maternity season defined here as May through September. If clearing activities must occur during the maternity season, biological monitors would inspect snags immediately prior to clearing to prevent destruction of active bat roosts.	X	X	X

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
Foresight would complete a total of two years of pre-construction avian and bat surveys for the initial phase area prior to construction of that phase. Foresight would complete a minimum of one year of pre-construction surveys within other portions of the wind park study area prior to construction of the initial phase. In addition, Foresight would complete a second year of pre-construction surveys for subsequent phase areas prior to construction of those phases. This would result in the completion of two years of pre-construction data in all developed portions of the wind park study area. These surveys could include: • avian use and breeding bird surveys. • surveys to identify active raptor nests. • surveys for caves, abandoned structures, and/or ground fissures to identify potential bat roosting habitat within the wind park study area. • acoustic monitoring and mist-net surveys for bats. • sensitive species surveys or habitat mapping.	X		
Two years of post-construction studies would be conducted to assess bird and bat fatality rates resulting from operation of the wind park, and fatality monitoring using carcass searches and bias trials would be conducted to produce seasonal and annual fatality estimates. In addition, post-construction use monitoring would be conducted concurrently for bats (using acoustic monitoring) and birds (using point-count methodologies) to replicate pre-construction surveys. Information collected during post-construction studies completed for the initial phase would inform adaptive management of the initial phase and siting and adaptive management of subsequent phases as part of the ABPP being voluntarily developed in consultation with the USFWS and AGFD.	X		
The ABPP being voluntarily developed by Foresight is intended to minimize potential impacts to birds, bats, and their habitats and to ensure compliance with applicable State and Federal laws. It would include, but not be limited to, construction requirements, post-construction avian and bat survey and reporting requirements, avian and bat mortality monitoring, and operational practices. The adaptive management process would draw from a toolbox of operational practices and/or compensatory measures to be implemented as needed if post-construction monitoring demonstrates that impacts are greater than anticipated. This toolbox could include curtailment strategies such as cut-in speed adjustments to reduce bat fatalities, for example.	X		
For the operational life of the proposed wind park, Foresight would document wildlife injuries or fatalities observed and report injuries or fatalities of Federal threatened, endangered and candidate species to USFWS and AGFD.	X		

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
The transmission tie-line and extension tie-line structures, conductors and design would meet suggested practices for avian protection on power lines, as recommended by guidance from the Avian Power Line Interaction Committee (APLIC) in 1994 and 2006 to minimize and mitigate risk of potential avian collisions or electrocutions along the proposed transmission tie-line and any other overhead transmission lines associated with the wind park. To the extent possible, electrical collection lines would be buried underground. A routine maintenance schedule to ensure functionality of APLIC approved bird strike diverters would be defined prior to construction and implemented. All above-ground power lines would include bird diverters per AGFD Guidelines (2009d).	X		X
Foresight would prepare a weed control plan for the wind park and proposed transmission tie-line that is designed to prevent the spread of non-native and invasive species. Foresight would also adhere to BMPs for the proposed transmission tie-line that are expected to be reflected in the Forest Service Special Use Permit, which could include items from *Integrated Treatment of Noxious or Invasive Weeds on the Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties, Arizona* (see Appendix C.2), as applicable to the Project.	X		X
Western would require its construction contractor to comply with Federal, State, and local noxious weed control regulations, including a clean vehicle policy while entering and leaving the switchyard construction site.		X	
The final layout plan would take into consideration recommendations in AGFD's *Guidelines to Reducing Impact to Wildlife from Wind Energy Development in Arizona* (2009d) to help reduce and avoid impacts to wildlife.	X		
Fill, rock, or additional topsoil would be obtained from the project area whenever possible. If rock or aggregate is obtained from off-site sources outside the project area, the material would be cleaned prior to entering the project site to prevent the introduction of invasive weeds and plant species.			X
Soil would be stored on or near its original location to minimize impacts to vegetation, reduce the potential for compaction and erosion of bare soils, and minimize the spread of invasive species.			X
All construction vehicles and equipment would be sprayed before initial ingress onto Forest Service-managed lands. A high pressure hose would be used to clear the undercarriage, tire treads, grill, radiator, and beds of any mud, dire, and plant parts that could potentially spread the seeds of noxious plants.		X	X
Foresight would use BMPs described in Forest Service Handbook (FSH) 2509.22 (or as amended) during construction and operation, including revegetating disturbed areas with native grasses and forbs.	X		X

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
During construction and operation, project personnel and all contractors would be instructed to remove garbage promptly to avoid creating attractive scavenging opportunities for birds. Construction of rock piles or other possible rodent den/nest sites would be minimized. Carrion would be promptly removed by project personnel when observed. Vegetation height would be managed around turbines to reduce raptor prey availability.	X		
The aerial limits of construction activities normally would be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate limits of survey or construction activity.			X
A traffic control plan would be developed prior to construction commencement per phase to minimize impacts to wildlife. Speed limits for construction and operations personnel along the access and service roads would be restricted to 25 miles per hour (mph) to reduce the risk of wildlife or livestock collisions and minimize noise. Vehicle movement associated with the project would be restricted to designated access and service roads and temporary construction areas.	X		X
Foresight would develop a Fire Plan, approved by the Forest Service, for the construction, operations, and maintenance of the transmission tie-line. Foresight would develop and implement an Emergency Response Plan for use during wind park and/or transmission tie-line construction and operation. The plan would contain emergency fire precautions, notification procedures, and emergency response sequences. These measures would help reduce or avoid impacts to wildlife.	X		
WTGs would consist of tubular supports with pointed nacelles rather than lattice supports to minimize bird perching and nesting opportunities. External ladders and platforms would not be used on WTGs to minimize perching and nesting opportunities for birds.	X		
Pursuant to FAA regulations all structures associated with the proposed wind park 200 feet above ground level would be lit as directed by the FAA, including the permanent met towers. Flash duration and lighting intensity would be the lowest permissible under FAA regulations that is commercially reasonable. Other facility lighting including lighting for the O&M building would be motion sensor activated rather than continuously lit. Wherever possible, infrastructure lighting would be down-shielded.	X		
Non-disturbance buffers would be established to protect sensitive habitats or areas of high risk for species of concern identified during pre-construction studies.	X		
WTGs would not be sited in canyon bottoms which contain water sources where bird species diversity and/or density could be significantly higher than other areas of the project.	X		

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
If practicable, WTGs would be sited to buffer stock tanks or ponds. If it is not practicable to locate turbines away from stock tanks or ponds, these features would be relocated away from the nearest WTG, if feasible.	X		
Foresight has designed the initial phase to avoid prairie dog towns and buffer raptor nest sites, based on the results of Spring/Summer 2011 field surveys. Prairie dog town mapping was completed during 2007–2008 and during June–August 2011. Additional surveys would be conducted prior to final layout design for the initial build out phase, and this information would be used when developing the final micro-siting layout. The post-construction monitoring survey results for the initial phase would be evaluated to determine whether non-disturbance buffers of prairie dogs would be recommended for future build out phases.	X		
CULTURAL RESOURCES			
Construction and operations activities would be consistent with the PA to ensure that any NRHP-eligible archeological sites and TCPs would be protected.	X	X	X
Consistent with the PA, TCPs or other sensitive areas identified by Tribes in advance of project design would be considered during project design and buffered to the extent practical.	X	X	X
Foresight, Western, and the Forest Service, through the PA, are committed to achieving "no adverse effect" by avoiding NRHP-eligible cultural resources to the extent feasible and practical. Foresight would move, modify, or cancel impacting activities to reduce or eliminate adverse effects to historic properties. If an eligible historic property cannot be avoided, Western would prepare a treatment plan per the PA.	X	X	X
Per the PA, Western would make determinations of eligibility and effect in consultation with the PA signatories and appropriate tribes. Foresight and Western would act in accordance with the PA's unanticipated discovery provisions.	X	X	X
Per the PA, the appropriate tribal representatives, SHPO, and Forest archeologist (if on Forest Service-managed lands) would be contacted if a burial site is encountered during construction in accordance with the PA's unanticipated discovery provisions and the Native American Graves Protection and Repatriation Act.	X	X	X
No surface disturbance would occur within the boundary of any NRHP-eligible property prior to completion of a treatment plan that would be reviewed and approved by the PA signatories.	X	X	X
No surface disturbance would occur within the boundary of a site identified and recommended for listing under NRHP until its eligibility is determined. If a site is determined to be eligible, no surface disturbance would occur within the boundary of the site prior to completion of a treatment plan that would be reviewed by the PA signatories.	X	X	X

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
Prior to construction, all construction personnel would be instructed on the protection of cultural, paleontological, and ecological resources. To assist in this effort, the construction contract would address (a) Federal, State, and Tribal laws regarding cultural resources, fossils, plants and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.	X	X	X
GEOLOGY AND SOILS			
Except where necessary for the safe installation of the new structures, measures would be taken to confine vehicle traffic to the existing roads and minimize the disturbances to the soil protective mechanisms (i.e., vegetation and soil crusts).			X
If soil moisture would cause off-road rutting by construction equipment, movement of construction equipment could be temporarily discontinued as directed by the Forest Service for project elements located on Forest Service-managed lands.			X
Temporary construction areas, access road buffer zones, temporary construction roads, and staging areas would be restored to a condition similar to that which existed prior to disturbance where practicable. Where necessary, land would be restored with natural contours and revegetation with native species so as to avoid impact to natural drainages, water quality or visual resources.	X	X	X
Foresight would use BMPs described in FSH 2509.22 during construction and operation of the proposed transmission tie-line to protect topsoil and to minimize soil erosion. Practices could include: • containing excavated material; • applying water, gravel, or other surface palliative; • use of silt fences; • protecting exposed soil with fabrics (especially near wetlands); • stabilizing restored surfaces; and/or • revegetating disturbed areas.	X		X
Construction managers would be careful to stabilize disturbed soils promptly to avoid erosion and invasive weeds. Disturbed areas would be seeded with a mix chosen with assistance from the landowner or land management agency to ensure it would meet their objectives.	X		X
Areas disturbed during site grading outside the switchyard's footprint and at the switchyard construction staging area would be regraded so that all surfaces drain naturally, blend in with the natural terrain, and prevent erosion or transport of sediments. If revegetation is required by the Forest Service, Western would use seed mixtures as recommended by the Forest Service.		X	X
Construction activities and revegetation efforts would avoid, to the extent feasible, spreading subsurface soils over or mixing them with surface soils.			X

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
AIR QUALITY			
Unpaved access roads and areas scheduled for earthmoving activities would be watered, graveled, or treated on a regular basis to minimize dust. Oil shall not be used as a dust suppressant.	X	X	X
Stockpiled soils or materials shall be covered, watered, or treated with a palliative for a visible crust when not currently being used.	X		
Vehicles traveling on unpaved surfaces shall be restricted to 25 mph to minimize the creation of dust.	X		
Western's contractor and subcontractor machinery shall have, and shall use, the air emissions control devices required by Federal, State or local regulation or ordinance.		X	
Western's contractor shall remove all waste material from the construction site; no waste shall be left on Western property, right-of-way, or easement. Burning or burying of waste material is not permitted.		X	
Dump trucks would be covered before traveling on public roads.	X		
Equipment would be shut off rather than left idling between uses unless that equipment requires a significant start up or idling prior to use for proper operation.	X		X
The rock crusher would contain dust-suppression features including screens and water-spray.	X		
Operation of the rock crusher and concrete batch plants would require individual minor source permits or a combined general permit from Arizona Department of Environmental Quality (ADEQ). The construction contractor would obtain authorization to operate under the general permits available for these facilities and would comply with all terms and conditions of the permit(s).	X		
Ground-disturbing construction activities would be restricted during high-wind events, and water or other palliative treatment would be applied as necessary to active earthmoving areas to minimize non-point source emissions of particulates.	X		X
To control emissions from material handling and loading activities, transfer points would be enclosed or water sprays or other palliative treatments would be used.	X		X
Foresight would require its contractor to use equipment that meets current EPA emissions performance standards for engines between 100–175 horsepower.	X		X
Foresight would require its contractor to use ultra-low sulfur diesel fuels for all equipment for which such fuel is technically feasible to substantially reduce tailpipe emissions of SO_2 and PM_{10}.	X		X
Western would ensure that construction activities and the operation of equipment are undertaken to reduce the emission of air pollutants by requiring its construction contractor to submit a copy of permits for construction activities, if required, from Federal, State, or local agencies 14 days prior to the start of work.		X	

TABLE 2.7-1
PROJECT RESOURCE PROTECTION MEASURES

Resource Protection Measure	Foresight (Wind Park and Tie-line)	Western (Switchyard)	Coconino NF (Tie-line and Switchyard)
WATER RESOURCES			
Foresight would avoid, to the extent possible, placing temporary or permanent facilities in floodplains and washes.	X		X
Construction activities would be conducted in a manner to minimize disturbance to floodplains, vegetation, drainage channels, and stream banks.	X	X	X
Foresight's final layout plan for initial and subsequent phases would avoid features identified as jurisdictional waters of the U.S., or reduce the quantity of jurisdictional waters impacted, by locating WTGs outside of jurisdictional waters and aligning access roads and utility infrastructure parallel to identified crossings to avoid perpendicular crossings, to the extent feasible. Where crossings cannot be avoided engineered controls would be implemented during construction to minimize impacts to the watershed by maintaining pre-development flow conditions in downstream reaches. Engineered controls would include, to the extent practicable, locating crossings to minimize adverse effects by using culverts, low-water crossings, or energy dissipation treatments; burying utilities below the grade of a water course; or using directional drilling by boring the planned utility under an affected watercourse.	X		X
An Arizona Pollutant Discharge Elimination System (AZPDES) permit would be obtained and a Stormwater Pollution Prevention Plan (SWPPP) prepared for disturbed areas include staging, parking, fueling, stockpiling, and any other construction related activities. The SWPPP would include both structural and non-structural BMPs.	X	X	
Foresight would use BMPs during construction, operation, and maintenance of the site to protect topsoil and water resources and to minimize soil erosion. Practices could include containing excavated material, applying water or other palliative treatment, use of silt fences and fabrics, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas with native species.	X		X
BMPs would be adopted as part of the SWPPP to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record keeping practices, as necessary, to prevent storm water pollution.	X	X	
Site-specific BMPs would be identified on the construction plans for the site slopes, construction activities, weather conditions, and vegetative buffers. The sequence and methods of construction activities would be controlled to limit erosion. Clearing, excavation, and grading would be limited to the minimum areas necessary to construct the project.	X		X
In addition to BMPs in the SWPPP, Foresight would adhere to site specific BMPs identified by the Forest Service in its special use permit.	X		X

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
A Spill Prevention, Control, and Countermeasure (SPCC) Plan would be prepared before construction to identify procedures for preventing spills of pollutants including hazardous materials and for responding appropriately if a spill occurs.	X		X
Western would ensure that its construction contractor obtains a dewatering permit from the appropriate agency if required for construction dewatering activities.		X	
Foresight would ensure that hazardous materials, fuels, and lubricants shall not be drained onto the ground or into drainage areas.	X		X
Watering facilities and other range improvements would be repaired or replaced if they are damaged or destroyed by construction activities to their condition prior to disturbance, as agreed to by the parties involved.	X		X
Western would require that its construction contractor control runoff from excavated areas and piles of excavated material, construction material or wastes (to include truck washing and concrete wastes), and chemical products such as oil, grease, solvents, fuels, pesticides, and pole treatment compounds. Excavated material or other construction material shall not be stockpiled or deposited near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas where run-off could impact the environment.		X	
Western would not permit the washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water. Concrete wastes shall be disposed in accordance with all Federal, State, and local regulations.		X	
TRANSPORTATION			
Foresight would comply with all local, State, and Federal transportation regulations and would develop a traffic control plan in consultation with the Coconino County Public Works Department prior to wind park and/or transmission tie-line construction activities.	X		
Damage to existing public roadways caused by wind park and/or transmission tie-line construction would be repaired to pre-construction condition in accordance with the appropriate jurisdictional authority.	X		
Wind park and/or transmission tie-line construction crews would use regulation-sized vehicles, except for specific construction equipment which could haul oversized loads.	X		
Local hauling permits from appropriate agencies would be obtained prior to wind park and/or transmission tie-line construction and adhering to their conditions.	X		
Wind park and/or transmission tie-line construction equipment transport and deliveries would be scheduled to occur during the day to the extent practical to limit additional traffic during commuting hours.	X		

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
Foresight would obtain Determination of No Hazard Air Navigation Permits for all structures over 200 feet from the FAA and an FAA-approved Lighting Plan.	X		
HEALTH, SAFETY, AND SECURITY			
During wind park and/or transmission tie-line construction, standard health and safety practices would be conducted in accordance with the most recent Occupational Health and Safety Administration's (OSHA) policies and procedures.	X		
For the switchyard, Western's construction contractor would comply with the latest effective OSHA standards and other applicable Federal, State, and local regulations. During operations, facility maintenance would be conducted in accordance with Western's Power Safety Manual, which meets or exceeds OSHA requirements.		X	
Risk of construction-related injury would be minimized through regular safety training for construction personnel, use of appropriate safety equipment, and compliance with applicable construction safety standards.	X		
Foresight would develop and implement an Emergency Response Plan for use during wind park and/or transmission tie-line construction and operation. The Plan would contain emergency fire precautions, notification procedures, and emergency response sequences.	X		
Security measures would be taken during construction and operation, including temporary and permanent (safety) fencing at the substations, warning signs, and locks on select equipment and WTGs. Turbines would sit on steel-tubular towers. All electrical equipment would be located within the towers except for the pad-mounted transformer and collection system. Access to the tower would be through a steel door that would be locked when not in use.	X		
Western's security measures, to be taken during construction and operation of the switchyard, would include temporary and permanent (safety) fencing at the switchyard and warning signs.		X	
Access to the wind park and/or transmission tie-line construction site would be monitored, to the extent possible, to avoid unauthorized public access.	X		
Signs would be posted at the entrance of wind park access roads to alert the public and maintenance workers of potential ice shedding risks.	X		
Western would require its construction contractor to provide a Tanker Oil Spill Prevention and Response Plan as required by the U.S. Department of Transportation, if oil tankers with volume of 3,500 gallons or more are used as part of the project.		X	

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
During the design of Western's proposed switchyard, a determination would be made on the need for secondary containment per SPCC Plan requirements. If required, secondary containment would be installed within the substation to prevent the migration of oil from the switchyard site.		X	
Material Safety Data Sheets for potentially hazardous materials would be provided to local fire and emergency service personnel and to land management agencies.	X		
As dictated in the SPCC Plan, hazardous materials and petroleum products would be handled in accordance with applicable local, State and Federal laws and regulations. Totally enclosed containment would be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be removed to a disposal facility authorized to accept such materials.	X		X
As dictated in the SPCC Plan, fuel or hazardous waste leaks, spills, or releases would be reported immediately to the appropriate land management agencies that administer the land where the incident occurs, as well as appropriate State or Federal agencies that regulate spills.	X		X
The proposed transmission tie-line would be designed and operated to comply with industry best practices for controlling electric and magnetic fields.	X		
Western would require its construction contractor to dispose or recycle waste material in accordance with applicable Federal, State, and local regulations and ordinances. No waste shall be left on Western property, right-of-way, or easement. Burning or burying of waste material is not permitted.		X	
Western would develop a Fire Plan, approved by the Forest Service, for the construction, operations, and maintenance of the proposed switchyard.			X
Foresight would develop a Fire Plan, approved by the Forest Service, for the construction, operations, and maintenance of the transmission tie-line.	X		X
NOISE			
All engine-powered equipment would have mufflers installed according to the manufacturer's specifications and would comply with applicable equipment noise standards.	X		
Wind park and/or transmission tie-line construction crews would locate stationary construction equipment a minimum of one-half mile from residences.	X		
Wind park and/or transmission tie-line construction operations would be primarily scheduled during daylight hours.	X		X
Residences within a mile of the wind park study area and land management agencies would be notified whenever extremely noisy work, including blasting, would occur.	X		

TABLE 2.7-1 PROJECT RESOURCE PROTECTION MEASURES			
Resource Protection Measure	**Foresight (Wind Park and Tie-line)**	**Western (Switchyard)**	**Coconino NF (Tie-line and Switchyard)**
If helicopter construction is required, helicopter staging areas would be sited a minimum of one mile from residences. In addition, helicopter pilots would be instructed to avoid flight paths over residential areas, or other sensitive receptors.	X		
VISUAL RESOURCES			
Clearing of the transmission tie-line right-of-way shall be performed so as to minimize landscape impact and preserve the natural beauty to the maximum extent possible. Except for danger trees, no clearing shall be performed outside the limits of the construction right-of-way.	X		X
Industry-standard finishes (neutral white or gray) would be used for the WTG towers, nacelles, and rotors to minimize contrast with the sky backdrop.	X		
Neutral gray and non-reflective finishes would be used for all permanent structures that are part of the transmission tie-line. Non-reflective steel should be used in the switchyard where possible due to forested nature of that site.	X		X
Exterior lighting on the turbines required by the FAA would be kept to the minimum number and intensity required to meet FAA standards.	X		
Outdoor lighting at the O&M facility, substations, and switchyard would be limited to the minimum required for safety and security. Except for the switchyard, sensors and/or switches would be used to keep lighting turned off when not required. Light fixtures would minimize backscatter and offsite light as required by the Coconino County lighting ordinance and would utilize down-shields where appropriate.	X	X	X

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter discusses environmental and human resources, including areas such as land use and economics that could be affected by the Grapevine Canyon Wind Project and describes the environmental consequences (direct and indirect impacts) of the proposed wind park, transmission tie-line, and Western's switchyard. The discussion of these topics under each resource section is structured into the Affected Environment and Environmental Consequences. The Affected Environment describes the existing conditions within the study area specific to the resource or other areas of interest to establish the base condition. As part of this description, a resource evaluation area is described. The resource evaluation area is the physical area that bounds the environmental, sociological, economic, or cultural feature of interest that could be impacted by construction and operation of the proposed project. The boundary of the resource evaluation area varies depending on the resource being analyzed.

The Environmental Consequences sections under each resource are the scientific and analytical basis for the EIS and provide an assessment of potential impacts resulting from implementation of the proposed project. An environmental impact is a change in the status of the existing environment as a direct or indirect result of the proposed project. Impacts can be direct or indirect, positive (beneficial) or negative (adverse), and permanent (long-term) or temporary (short-term). Direct impacts are those that are the result of construction, operation, and/or maintenance, whereas indirect impacts generally occur following construction and may not be directly related to the project. Short-term impacts are generally associated with the construction phase of the project, while long-term impacts remain for the life of the proposed project and beyond. To define the criteria for impact evaluation, "thresholds of significance" for a given environmental effect are provided for each resource area. These thresholds of significance establish benchmarks for increasing levels of effects, the highest of which is "significant impact." Per 40 CFR 1508.27, "significantly" as used in NEPA requires considerations of both context and intensity. (a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant. (b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency could make decisions about partial aspects of a major action[1].

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[1] The following should be considered in evaluating intensity:

1. Impacts that could be both beneficial and adverse. A significant effect could exist even if the Federal agency believes that on balance the effect would be beneficial.
2. The degree to which the proposed action affects public health or safety.
3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.
5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
6. The degree to which the action could establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
8. The degree to which the action could adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP or could cause loss or destruction of significant scientific, cultural, or historical resources.
9. The degree to which the action could adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Mitigation to reduce possible project effects are embedded as part of Foresight's Proposed Project and Western's proposed switchyard and include Forest Service measures that would be implemented on Forest Service-managed lands for the proposed transmission tie-line and switchyard. The mitigation includes the RPMs in Table 2.7-1. Foresight, Forest Service, and Western committed to this mitigation prior to the evaluation of environmental impacts.

After discussion of impacts by resource section, this chapter also addresses Short-term Uses and Long-term Productivity, Unavoidable Adverse Effects, and Irreversible and Irretrievable Commitments of Resources. A discussion of Cumulative Impacts for the project is provided in Chapter 4.

3.1 LAND USE

3.1.1 Affected Environment

3.1.1.1 Resource Evaluation Area

The land use evaluation area includes the proposed wind park and primary access routes, the proposed transmission tie-line right-of-way, and the proposed Western switchyard, as well as a two-mile buffer extending beyond each of these three components. This two-mile buffer is the distance within which existing or proposed land uses could be directly or indirectly affected by the proposed project components, considering the location and height of the WTGs, and the level of noise expected during construction, operation, and maintenance of the wind park, transmission tie-line, and switchyard.

3.1.1.2 Characterization

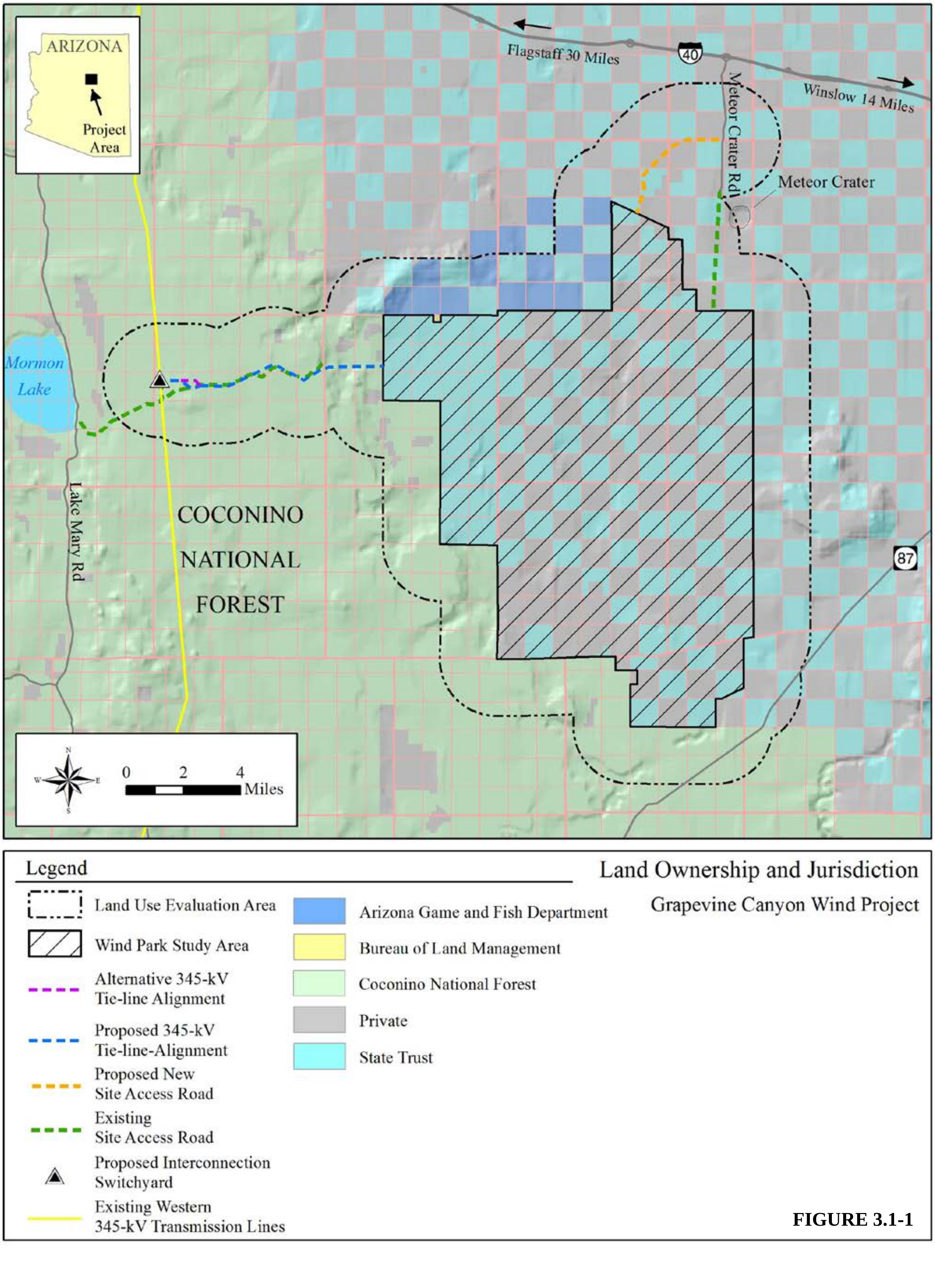
Information was collected for the land use evaluation area on land ownership and jurisdiction, existing land use, zoning, and planned land uses. Inventoried data were gathered through aerial photograph interpretation, field verification, and review of various documents including the Coconino County Comprehensive Plan, Coconino County Zoning Ordinance, Coconino National Forest Plan, and Diablo Canyon Rural Planning Area (RPA), a 2005 amendment to the Coconino County Comprehensive Plan. In addition, jurisdictional websites were accessed for information, and discussions were held with agency staff.

Land Ownership and Jurisdiction

Land ownership and jurisdiction depicts the limits of administrative or jurisdictional control maintained by the major landholders located in the vicinity of the proposed project components (Figure 3.1-1). Land status designations are important to the siting of wind parks, transmission lines, switchyards, and related access roads because they influence or directly determine such things as expenditure of management funds, land use and zoning regulations, and administrative planning goals for particular parcels or districts.

The private and State trust lands within the land use evaluation area fall under the jurisdiction of Coconino County. The private lands are owned by the Flying M Ranch and the Bar T Bar Ranch, and the State trust lands are administered by the ASLD.

Flying M Ranch is a combination of a number of historic homesteads which were purchased over the years by the Metzger family, with its first claim filed on Anderson Mesa in 1914. The ranch covers approximately 90,000 acres, a quarter of which is located on private land, and the remainder of which consists of Forest Service grazing allotments and ASLD grazing leases.



Land Ownership and Jurisdiction

Grapevine Canyon Wind Project

FIGURE 3.1-1

The land that comprises Bar T Bar Ranch has been acquired from several ranches by the Tremaine and Chilson families since as early as 1913. Bar T Bar extends across approximately 326,200 acres. The ranch is located on private land, ASLD grazing leases, and Forest Service grazing allotments. Bar T Bar Ranch is now in its third generation of ownership and operation by the Chilson family.

Lands administered by ASLD are scattered throughout the land use evaluation area and typically have grazing leases. A portion of these lands, external to and north of the wind park study area, make up the Raymond Ranch Wildlife Area. The Raymond Ranch Wildlife Area is managed by AGFD. The ranch was acquired by AGFD in 1942 and is 14,637 acres in size, of which 9,438 acres are owned in fee and the remainder are leased from ASLD for grazing. Initially the AGFD operated ranch was managed to provide Winter range to the pronghorn antelope. However in 1945, a small herd of bison was introduced to the ranch and the management objectives of the ranch were expanded to include these animals. Today, the ranch provides range for many species of big game and the management objectives have continued to evolve. Currently the grazing of livestock is prohibited on all lands operated as part of the Raymond Ranch Wildlife Area.

In addition, Federal lands are located within the land use evaluation area, generally west of the proposed wind park study area. The vast majority of Federal land within the land use evaluation area is under the jurisdiction of the Forest Service. Forest Service-managed lands are administered for multiple uses. They are primarily used for grazing but also for dispersed uses such as recreation, hunting, and other forest management activities. An isolated parcel of land, approximately 40 acres in size, is under the jurisdiction of the U.S. Department of the Interior, Bureau of Land Management (BLM), Hassayampa Field Office, and is located external to and just north of the wind park study area.

Existing Land Use

Developed land use within the land use evaluation area is limited to a few scattered residences, outbuildings, corrals, and limited commercial development. The closest residences are located near the northwest corner of the wind park study area, which is the location of the Flying M Ranch Winter headquarters. The vast majority of the land use evaluation area, including Federal and State trust lands, is used primarily for grazing (Figure 3.1-2). Some of these lands are also used for recreation.

Two commercial developments are located near the land use evaluation area. Meteor Crater, an impact crater created by a meteorite approximately 50,000 years ago (Meteor Crater Enterprises, Inc), is located approximately two miles external to and northeast of the wind park study area (Figure 3.1-3). Meteor Crater Enterprises, Inc. operates a museum, gift shop, and fast-food restaurant near the north rim of the crater. In addition, Meteor Crater Enterprises, Inc. operates another development located at the Meteor Crater Road exit, south of I-40. The development includes a recreational vehicle (RV) park, convenience market with gas sales, and a fast-food restaurant. Business offices for Meteor Crater Enterprises, Inc. are also located in this development.

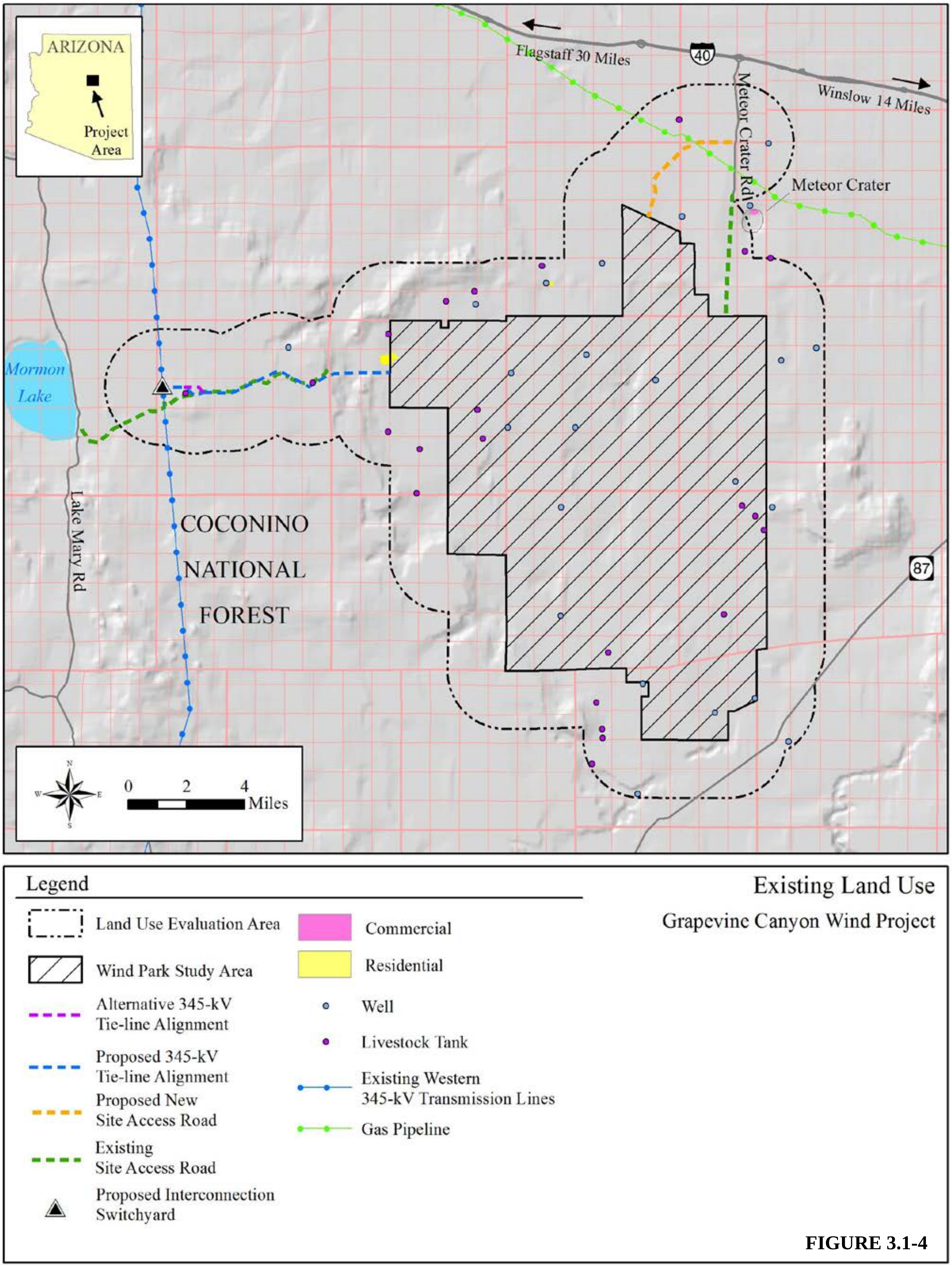
Other land uses within the land use evaluation area include roads, electrical and natural gas transmission lines, and a number of livestock tanks and wells. The Glen Canyon-Pinnacle Peak 345-kV transmission lines, operated by Western, are located approximately seven miles west of the wind park study area. The transmission lines travel in a north-south direction and are supported by steel lattice towers. These lines carry electricity from Glen Canyon Power Plant on the Colorado River and the Navajo Generating Station near Page, Arizona to the metropolitan Phoenix area. Western’s proposed switchyard would interconnect with these transmission lines for the proposed wind park. Existing land uses are shown in Figure 3.1-4.

FIGURE 3.1-2

Open range land on Anderson Mesa within the land use evaluation area (transmission tie-line).

FIGURE 3.1-3

Meteor Crater located north and east of the wind park study area is over 4,000-feet across and 570-feet deep. The crater, privately owned by Meteor Crater Enterprises, has been a popular tourist attraction since the early 1900s.



ARIZONA
Project Area
Flagstaff 30 Miles
40
Winslow 14 Miles
Meteor Crater Rd
Meteor Crater
Mormon Lake
Lake Mary Rd
COCONINO NATIONAL FOREST
87
0 2 4 Miles
Legend
Land Use Evaluation Area
Wind Park Study Area
Alternative 345-kV Tie-line Alignment
Proposed 345-kV Tie-line Alignment
Proposed New Site Access Road
Existing Site Access Road
Proposed Interconnection Switchyard
Commercial
Residential
Well
Livestock Tank
Existing Western 345-kV Transmission Lines
Gas Pipeline
Existing Land Use
Grapevine Canyon Wind Project

FIGURE 3.1-4

Agriculture and Grazing

There are no agricultural lands actively under cultivation and no lands are classified as prime farmland by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) within the land use evaluation area.

Livestock grazing, especially cattle grazing, is the dominant land use and occurs throughout the majority of the land use evaluation area on Federal, State trust, and private lands. Livestock grazing is authorized on lands administered by the Forest Service and ASLD by permit only. Permits are issued over a specified length of time for a specific unit of land, referred to as a grazing allotment on Federal land and a grazing lease on State trust land. Grazing allotments on Forest Service-managed lands are expressed in terms of total animal unit months (AUMs), and grazing leases on State trust land are expressed in animal units (AUs). An AU is defined as one mature (1,000 lb.) cow or the equivalent based on an average consumption rate of 26 pounds of forage dry matter per day, and one AUM is the amount of forage required by an AU for one month, or the tenure of one AU for a one-month period. Grazing allotments and leases within the land use evaluation area, including acres and AUMs/AUs specific to each unit, are depicted Figure 3.1-5.

Recreation

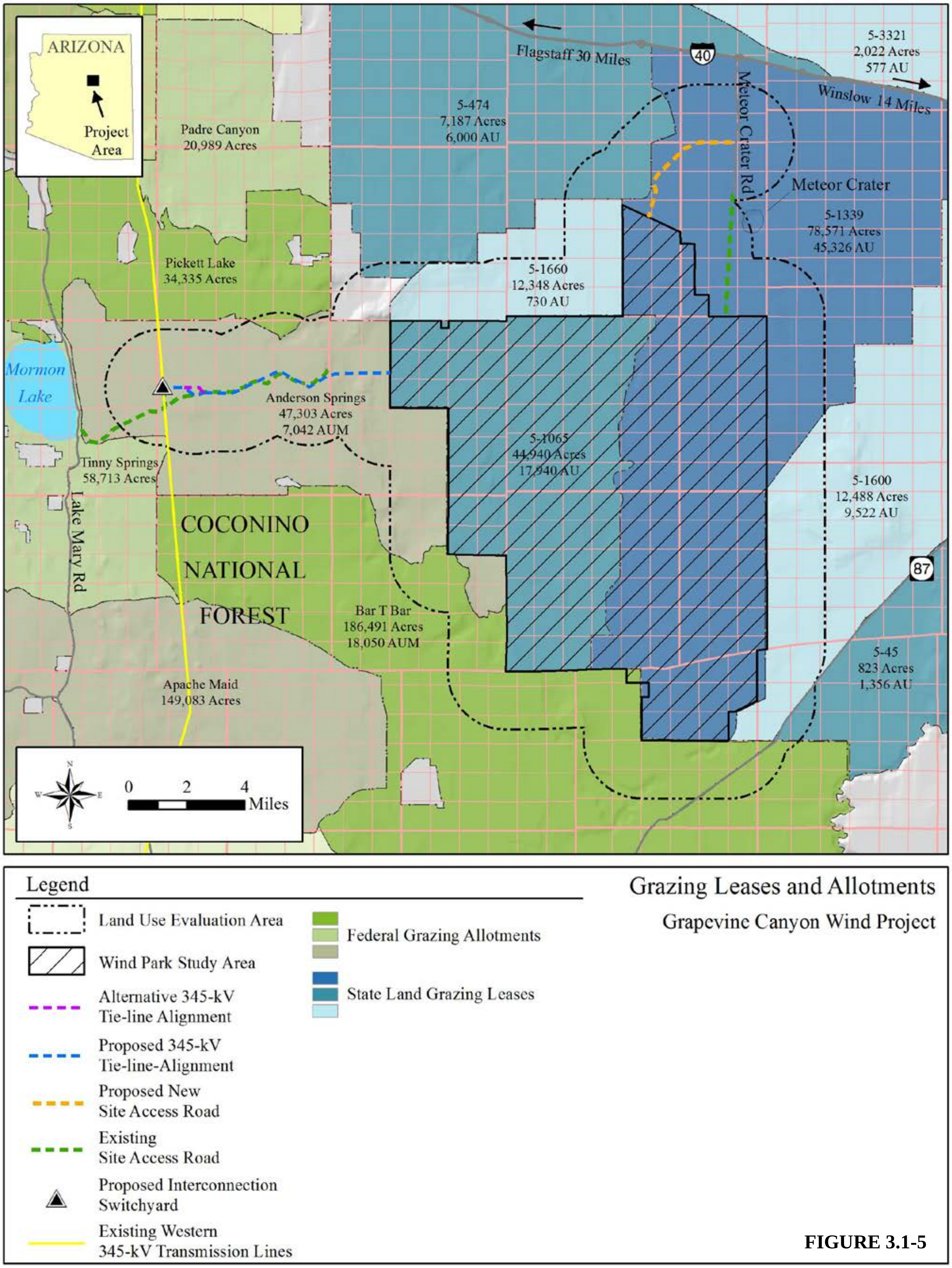
Federal lands are considered public. Public lands under the jurisdiction of the Forest Service and BLM are managed for multiple uses, including recreation. Forest Service-managed lands within and surrounding the land use evaluation area offer a variety of recreation opportunities including boating, swimming, fishing, camping, all-terrain vehicle use, picnicking, hiking, rock climbing, horseback riding, mountain biking, and hunting. Recreation in the vicinity of the proposed transmission tie-line is mostly dispersed in nature and includes camping in the Pine Hill area, located toward the western end of the proposed transmission tie-line and alternative (Figure 3.1-6). Jacks Canyon, considered one of the best sport climbing locations in the country, is located just south of the wind park study area (Figure 3.1-7).

Although State trust lands managed by ASLD are not considered public land, the opportunity for dispersed recreation on these lands is available within the land use evaluation area, but requires a permit.

The AGFD-managed Raymond Ranch Wildlife Area, located just north of the wind park study area, is open to camping, hunting (in season), and wildlife viewing.

Hunting in the State of Arizona is regulated by the AGFD, which mandates hunting season dates, legal wildlife, the number of permits authorized, and licensing fees. All valid hunting licenses are also issued by the AGFD. Hunting is permitted within the land use evaluation area, subject to Federal and State regulation, local ordinances, and seasons. Hunting is allowed on State trust lands through a recreation permit and on private land with permission from landowners.

Big and small game hunting currently occurs throughout the land use evaluation area. This area sits within the AGFD's Game Management units 5A and 5B, managed by the Flagstaff regional office. Figure 3.1-8 depicts the location of these management units with respect to the land use evaluation area. Game species include antelope, band-tailed pigeon, black bear, cottontail rabbit, deer (mule and white-tailed), elk, Merriam's turkey, mountain lion, tree squirrel, and waterfowl. Hunting seasons vary by species, but generally occur between the months of August and December. Hunts for big game species are issued on a draw basis and are generally limited to one animal of each species type, per hunter, per calendar year. The number of tags per Game Management Unit varies by year and species and is determined by AGFD.



Grazing Leases and Allotments

Grapevine Canyon Wind Project

FIGURE 3.1-5

FIGURE 3.1-6

Anderson Mesa, located within the land use evaluation area (transmission tie-line), on the Coconino National Forest. The foreground shows FS 125 and Pine Hill is shown in the background on the left.

FIGURE 3.1-7

Jack's Canyon located just south of the wind park study area.
Source online at http://farm1.static.flickr.com/193/444408908_8ef56fc300.jpg.

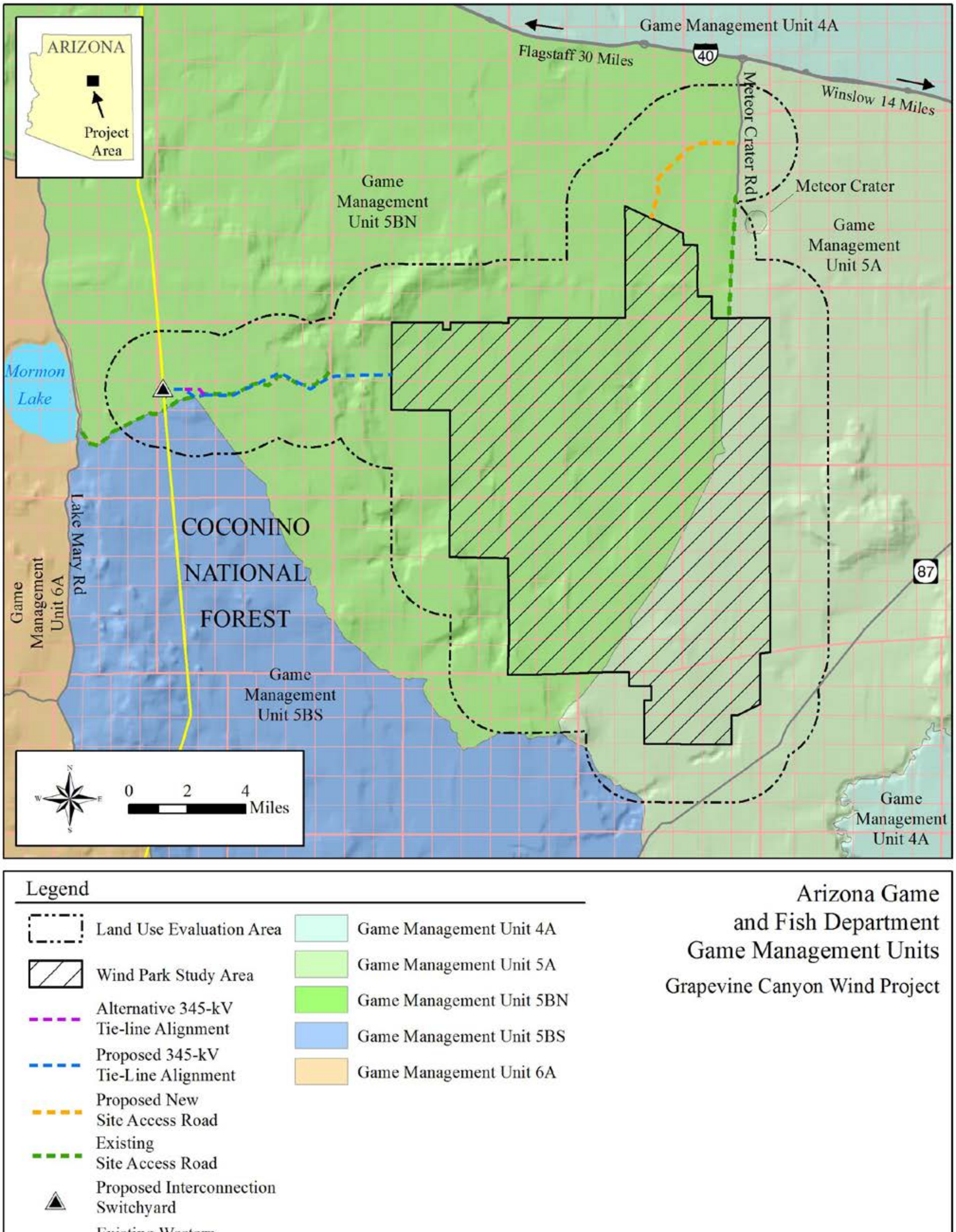

ARIZONA
Project Area
Game Management Unit 4A
Flagstaff 30 Miles
40
Winslow 14 Miles
Meteor Crater Rd
Meteor Crater
Game Management Unit 5BN
Game Management Unit 5A
Mormon Lake
Lake Mary Rd
COCONINO NATIONAL FOREST
Game Management Unit 6A
Game Management Unit 5BS
87
Game Management Unit 4A
0 2 4 Miles
Legend
Land Use Evaluation Area
Wind Park Study Area
Alternative 345-kV Tie-line Alignment
Proposed 345-kV Tie-Line Alignment
Proposed New Site Access Road
Existing Site Access Road
Proposed Interconnection Switchyard
Existing Western 345-kV Transmission Lines
Game Management Unit 4A
Game Management Unit 5A
Game Management Unit 5BN
Game Management Unit 5BS
Game Management Unit 6A
Arizona Game and Fish Department Game Management Units
Grapevine Canyon Wind Project

FIGURE 3.1-8

Zoning

Zoning is the single most commonly used legal device for implementing a land use plan or for controlling the type of development within a given area. Zoning is an exercise of police power. This police power resides with the Arizona State government whose purpose is to promote the health, safety, and general welfare of the community. Most State legislatures delegate the power of zoning to local governments, and this is true of Arizona as well. The source of statutory authority for the Zoning Code is in the form of the State enabling act. Specifically, this authority is granted to counties from the Arizona Revised Statute (ARS) Title 11. Section 11-821 allows for the creation of county zoning regulations and county zoning districts, Section 11-829 authorizes rezoning and zoning code amendments for counties, and Section 11-808 gives the Zoning Inspector authority for zoning enforcement and interpretation.

All privately owned land and State trust land within the land use evaluation area is located within the jurisdiction of Coconino County and is zoned G (General – 10 Acre Minimum). This zoning district is a general rural land use category intended for application to those unincorporated areas of the County with parcels of ten acres or more not specifically designated in any other zone classification. Only those uses that are complementary and compatible with a rural environment are permitted, including very low density residential development, as well as agricultural-related uses. Certain uses, including wind turbines and other utilities, are possible in this zone with the approval of a Conditional Use Permit.

Applicable Land Use Plans

Coconino National Forest Land Management Plan

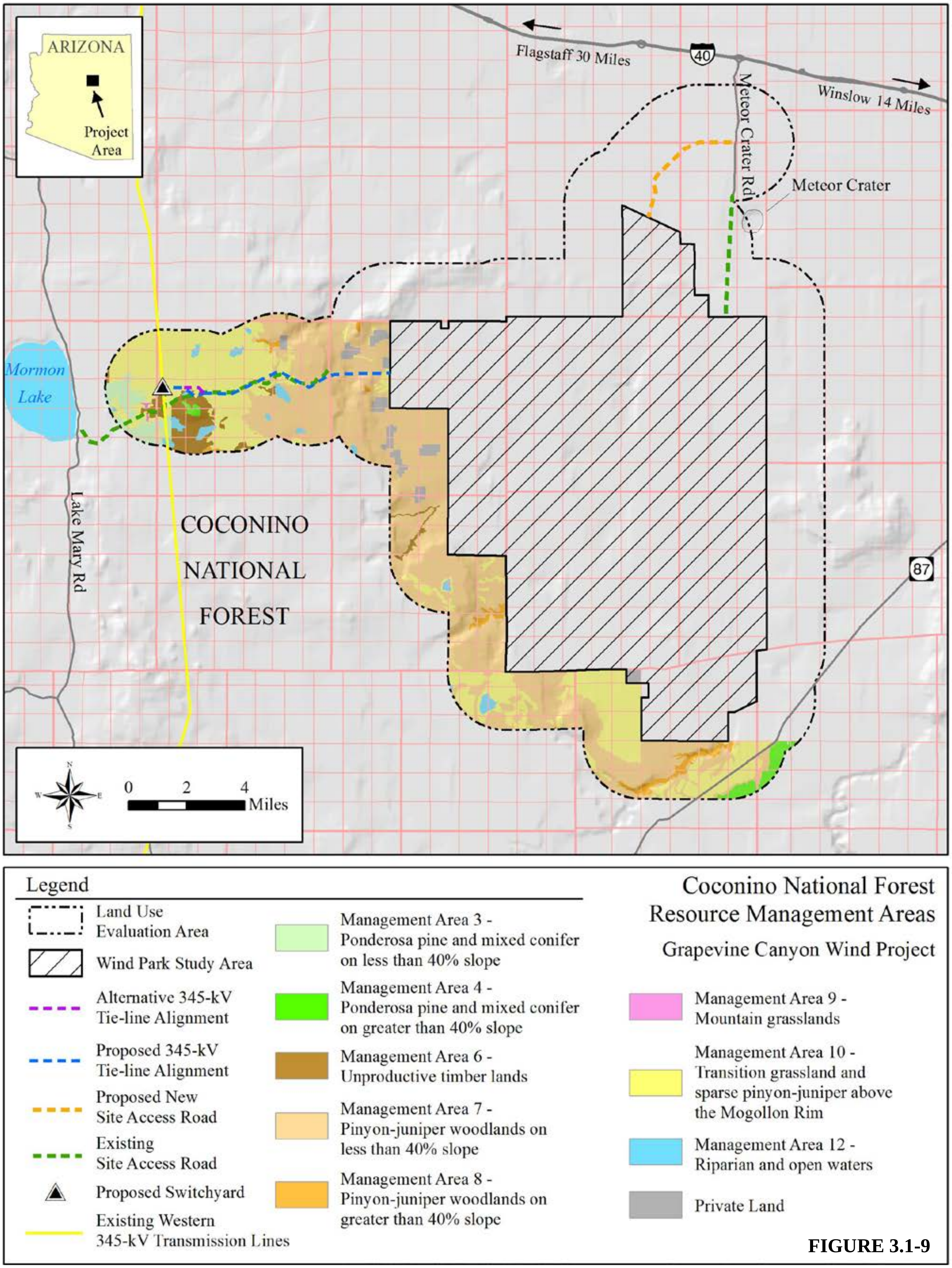
The Coconino National Forest Land Management Plan provides guidance on electrical transmission corridors. The Forest Plan explains that requests for electrical transmission corridors should be based on public need, economics, and environmental impacts. Utility corridors are managed to maintain resource conditions to the extent possible.

The proposed and alternative transmission tie-line and the proposed switchyard are subject to the Forest Plan. The Forest Plan does not prohibit the occurrence of the facilities on National Forest System lands, but requests that existing corridors be used whenever possible. Further, the Forest Plan states that when a new corridor is determined necessary it should be sited to avoid wilderness areas, Research Natural Areas, geological and botanical areas, the Elden Environmental Study Area, ponderosa pine and mixed conifer vegetation types, and impacts to threatened and endangered species.

The land use evaluation area is located within eight Management Areas (Figure 3.1-9). The proposed Western switchyard is located within Management Area 10 (Pinyon-juniper Woodland), and the proposed and alternative transmission tie-line traverses Management Areas 7 (Grassland and sparse Pinyon-juniper) and 10. The wind park study area does not fall within any Management Areas, since it is not located on National Forest System lands. In general, guidelines for these Management Areas promote wildlife habitat, particularly for indicator species; watershed condition; livestock grazing; and well-planned use of natural resources (e.g., timber, and maintenance and protection of scenic quality) (Forest Service, Southwestern Region 1987).

Coconino County Comprehensive Plan and Diablo Canyon Rural Planning Area

The Coconino County Comprehensive Plan is the document that guides the County on a course of action to manage growth, preserve the quality of life, and ensure sustainability. The ultimate goal of the plan is to present one document that reflects a County-wide consensus and ensures a coordinated effort between incorporated cities and towns; Federal, State, Native American, and regional agencies; and public/private service providers. Additionally, this plan aims to meet required State law "to conserve the natural resources of the County, to insure efficient expenditure of public funds, and to promote the health, safety, convenience, and general welfare of the public."



ARIZONA
Project Area
Flagstaff 30 Miles
40
Winslow 14 Miles
Meteor Crater Rd
Meteor Crater
Mormon Lake
Lake Mary Rd
COCONINO NATIONAL FOREST
87
0
2
4
Miles
Legend
Land Use Evaluation Area
Wind Park Study Area
Alternative 345-kV Tie-line Alignment
Proposed 345-kV Tie-line Alignment
Proposed New Site Access Road
Existing Site Access Road
Proposed Switchyard
Existing Western 345-kV Transmission Lines
Management Area 3 - Ponderosa pine and mixed conifer on less than 40% slope
Management Area 4 - Ponderosa pine and mixed conifer on greater than 40% slope
Management Area 6 - Unproductive timber lands
Management Area 7 - Pinyon-juniper woodlands on less than 40% slope
Management Area 8 - Pinyon-juniper woodlands on greater than 40% slope
Coconino National Forest Resource Management Areas
Grapevine Canyon Wind Project
Management Area 9 - Mountain grasslands
Management Area 10 - Transition grassland and sparse pinyon-juniper above the Mogollon Rim
Management Area 12 - Riparian and open waters
Private Land

FIGURE 3.1-9

The County looks at Federal and State trust lands as open space. Open space is “primarily undeveloped land that provides scenic, ecological, or recreational values.” The County’s goal is to “ensure the preservation of open space.” Additionally, the Comprehensive Plan lists the goal for utility services and corridors as “Promote the installation of utilities in a manner compatible with community character, scenic resources, and ecological integrity,” and a policy that “Utilities infrastructure shall be located in a manner sensitive to environmental and scenic resources.” Transmission lines over 115-kV are exempt from local jurisdiction.

Private lands within the land use evaluation area are located entirely within several large ranches. A Comprehensive Plan goal is to “preserve working ranches, unfragmented landscapes, and the County’s natural character.” In order to accomplish this goal, an additional method for long-term planning has been provided through the use of a RPA. One such RPA has been created within the land use evaluation area, the Diablo Canyon RPA which was a 2005 amendment to the Coconino County Comprehensive Plan (Figure 3.1-10).

The idea of an RPA was created by statute to provide a means of preserving traditional ranches for conservation. Specifically, the statute states that an RPA is an area created by a petition of owners of a majority of the property to prepare a plan that emphasizes voluntary, non-regulatory incentives for accommodating the continuation of traditional rural and agricultural enterprises as designated by the Board of Supervisors under ARS §11.806.D.3.

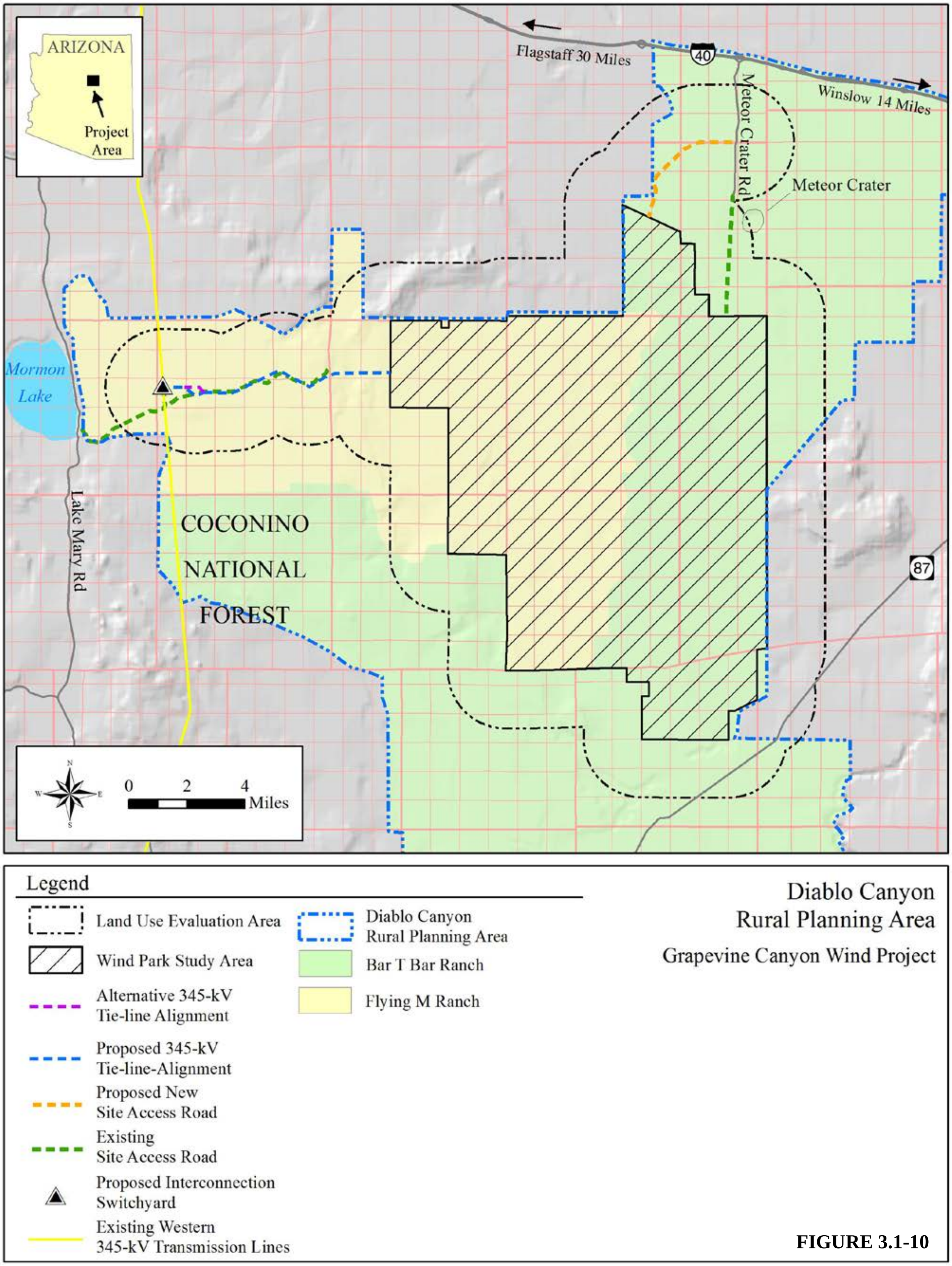
The Diablo Canyon RPA was established by the Coconino County Board of Supervisors on March 11, 2003, at the request of the Bar T Bar and Flying M Ranches, whose grazing leases and allotments are incorporated into the plan area (Figure 3.1-10). The final plan was approved by the Coconino County Board of Supervisors on August 16, 2005, and adopted as an amendment to the Coconino County Comprehensive Plan. The primary objectives of the Diablo Canyon RPA are to maintain historic ranching operations and address various economic opportunities as possible alternatives to supplement the cost of ranching and various range improvements.

Economic opportunities identified by the Diablo Canyon RPA include: 1) value added beef; 2) tourism, recreation, and education; 3) wood products; 4) energy development; 5) housing; 6) land protection options; and 7) other ideas to consider.

Specifically, the goal of the Diablo Canyon RPA with respect to energy development is to “facilitate the development of alternative energy projects while maintaining the integrity of the ranches and preserving aesthetics and views.” Two forms of alternative energy production were considered in detail, including biomass and wind. Wind has been studied in Coconino County for the past several years. The studies identified several sites throughout the County with potential wind resources sufficient to justify a wind park, including the majority of the Diablo Canyon RPA.

<u>Proposed Land Use</u>

There are no other proposed developments within the land use evaluation area (Coconino County Community Development Department 2009). Regionally proposed projects include the Sunshine Wind Park, located just north of the wind park study area. The Sunshine Wind Park includes approximately 40 state-of-the-art wind turbines that would provide 60 MW of generating capacity, enough electricity to serve the average annual electricity needs of more than 14,000 homes. This project received a Conditional Use Permit from Coconino County in early 2005 for the construction of up to 40 turbines. The project would advance pending a power purchase agreement (Sunshine Wind 2009).



Diablo Canyon Rural Planning Area

Grapevine Canyon Wind Project

FIGURE 3.1-10

In addition, several meteorological (met) towers have been installed throughout Coconino County, used to gather wind data necessary for the site evaluation and development of wind energy projects. Locations of the towers, and the associated owners, include the following:

- Sempra Energy has seven met towers and is negotiating a lease agreement with the Navajo Nation. Sempra has been working with the Cameron Chapter of the Navajo Nation for more than two years on developing a 500 MW wind power plant on Gray Mountain near Cameron, Arizona. Sempra has filed for interconnection into the Moenkopi-Eldorado Transmission Line and has begun the environmental and cultural monitoring that will be required by the Navajo Nation and the NEPA process. This project has been delayed and a project start date has not been identified.
- Northern Arizona University has been monitoring wind power since 2005 at several locations—five met towers at Aubrey Cliffs and one at Aubrey Valley near Seligman, Arizona; two met towers on Babbitt Ranches; and two met towers at Gray Mountain.
- Boquillas Wind has permits for five met towers at Aubrey Cliffs near Seligman, Arizona, on the Big Boquillas Ranch operated by the Navajo Nation. The Big Boquillas Ranch is comprised of intermingled State trust lands and private lands owned in fee simple by the Navajo Nation.

The County Community Development Department was not aware of any other proposed projects, including large-scale residential or commercial developments, within 25 to 30 miles of the land use evaluation area.

3.1.2 Environmental Consequences

3.1.2.1 Standards of Significance

Within the land use evaluation area, the following types of potential land use impacts are considered significant if Foresight's Proposed Project or the proposed Federal actions and alternatives would:

- Result in the loss of a residence or business structure.
- Create unresolved conflict with existing utility rights-of-way.
- Permanently remove acres of land from grazing to the point it affects the economic viability of the ranching operation.
- Cause major conflicts to established recreational areas.
- Eliminate, or severely curtail, the opportunity for hunting in the area.
- Conflict with adopted land use plans and goals of the community or area in which they are located, including open space designations, game management areas, or other types of areas designated for preservation.

3.1.2.2 Foresight's Proposed Project and Proposed Federal Actions

Wind Park

Land Ownership and Jurisdiction

The wind park study area would be located entirely on private and State trust land, under the jurisdiction of Coconino County. Lease agreements would be negotiated between the landowners and Foresight, including a long-term right-of-way from ASLD. These leases would allow construction and operation of the wind park over a negotiated term. In exchange, each landowner, including the Flying M Ranch, Bar T Bar Ranch, and ASLD would receive financial compensation on an annual basis.

Existing Land Use

The proposed wind park would be located on largely undeveloped land used for grazing. Existing residences and other ranch structures are located just outside of the wind park study area and would not be directly affected by project implementation. A buried natural gas pipeline is located within the wind park study area. Wind turbines would be placed outside of the pipeline right-of-way, and no impacts to the pipeline would be expected. The proposed wind park would not cause any unresolved conflicts with any other utility right-of-way, and listed land use significance standards listed in Section 3.1.2.1 would not be exceeded.

Grazing

Grazing is the predominant land use occurring throughout the wind park study area and would be allowed to continue as a compatible land use. The construction of the proposed wind park, if fully built out to 500 MW, would result in the temporary loss of 2,050 to 2,193 acres of grazing land, resulting in the temporary loss of approximately 1,010 to 1,080 AUs. With the proposed reclamation of disturbed areas not needed for permanent facilities, grazing land temporarily disturbed would return to production within approximately three years of the completion of construction activities. The placement of WTGs and access and service roads within the wind park study area would permanently remove 555 to 570 acres of land from grazing if fully built out to 500 MW, resulting in a permanent loss of approximately 273 to 281 AUs, less than one percent of the total for the wind park study area. More than 99 percent of the wind park study area would remain available to ranching, and the economic viability of the ranching operations would not be affected by the permanent removal of up to 570 acres of grazing land and the significance criteria related to grazing would not be exceeded.

Temporary and permanent acres of grazing land and the number of AUs that would be lost with the construction of the proposed wind park are shown in Table 3.1-1 arranged by ranch and ASLD lease number.

TABLE 3.1-1
SUMMARY OF THE EFFECTS OF THE 500 MW WIND PARK ON GRAZING

Ranch Name	Lease Number	Acreage within Wind Park	Total AUs within Wind Park	Temporary Land Disturbance[1] (%)	Temporary Grazing Impacts (AUs)[2]	Permanent Land Disturbance[1] (%)	Permanent Grazing Impacts (AUs)[2]
Flying M Ranch	5-1065	44,940	17,940	973-1,041 acres (2.2-2.3%)	389-415	263-270 acres (0.6%)	105-108
Bar T Bar	5-1339	49,742	28,695	1,077-1,152 acres (2.2-2.3%)	621-665	292-300 acres (0.6%)	168-173
TOTAL		94,682	46,635	2,050-2,193 acres (2.2-2.3%)	1,010-1,080	555-570 acres (0.6%)	273-281

[1] assume a proportionate distribution of land disturbance
[2] assume forage and capacity is even across all lands

Recreation

There would be no impacts to established, designated recreation areas. The proposed wind park would be located on a combination of private and State trust lands for which AGFD issues hunting permits. By law, no State trust lands can be closed to hunting or fishing without the consent of AGFD, and no person may lock a gate blocking access to these lands (ARS § 17-304 and Arizona Administrative Code R12-4-110). In the event it is determined that an area located on State trust lands should be closed to hunting during construction of the proposed wind park, Foresight would consult with the AGFD as required, and a temporary impact to hunting would occur. However, hunting is likely to be allowed throughout portions of the wind park study area located on State trust land once wind park operations begin. Thus, long-term opportunities for hunting in the wind park study area are not expected to be severely curtailed or eliminated, and significance criteria related to recreation would not be exceeded.

Zoning

The proposed wind park is not a permitted use within the County's General zone. However, wind turbines could be allowed within the zone subject to approval of a Conditional Use Permit. Foresight would obtain this required permit from Coconino County prior to beginning construction on any portion of the proposed wind park. With the issuance of the Conditional Use Permit, there would be no conflict with existing land use plans.

Applicable Land Use Plans

The overarching goal of the Diablo Canyon RPA is to supplement ranching operations with additional economic opportunities that allow for continued operations of ranches within the RPA. The proposed wind park would be located entirely within the Diablo Canyon RPA and would be consistent with its adopted land use plans and goals. The proposed wind park is, in fact, a proposed land use that enhances the General Plan goals of economic development for rural areas, and therefore represents a positive influence for the area to continue as a viable economic community into the foreseeable future.

<u>Transmission Tie-line</u>

Land Ownership and Jurisdiction

The proposed transmission tie-line would be located on private, State trust, and National Forest System lands. An agreement would be made between the private landowners and Foresight to secure a lease or right-of-way easement for these lands. Additionally, a 200-foot right-of-way would be obtained from ASLD and the Forest Service for the use of these lands. Foresight would be responsible for the payment of fees required for the use of private, State trust, and Federal lands.

Existing Land Use

The proposed transmission tie-line is located within portions of an existing cattle trail and adjacent to portions of an existing roadway. The cattle trail extends from the Flying M Ranch Winter range (wind park study area) to the Summer range on top of Anderson Mesa. Short-term impacts during transmission tie-line construction could occur to cattle moving along this trail; however, this would be considered a minor impact because construction of the transmission tie-line would be scheduled to avoid conflicts with the limited timeframes in which cattle would use the trail. Long-term impacts to the cattle trail and movement of cattle between the Winter and Summer ranges would be minimal and could be beneficial because the transmission tie-line would create a wider area cleared of vegetation that could be used by the cattle.

Grazing

Grazing occurs throughout the transmission tie-line study area and would be allowed to continue once the transmission tie-line is constructed and operating. The construction of the transmission tie-line would result in the temporary loss of 345 to 413 acres of land and the permanent removal of 19 to 25 acres of land from grazing. Impacts to grazing would be distributed between the Anderson Springs Allotment and ASLD Lease No. 5-1065, both part of the Flying M Ranch. However, with the proposed reclamation of disturbed areas not needed for permanent facilities, grazing land temporarily disturbed would return to production within approximately three years of the completion of construction. This would result in a minimal loss of land available to grazing and would not affect the economic viability of the ranching operations. Therefore, the significance standard associated with grazing would not be met.

Recreation

The impacts to hunting and recreation from the construction and operation of the transmission tie-line across private and State trust lands would be the same as those associated with the proposed wind park. Temporary impacts to recreation uses, such as noise, traffic, diminished views, and closure of areas during construction on Forest Service-managed lands could occur during the construction of the transmission tie-line; however, hunting and other recreation uses would not be expected to be restricted on private, State trust, and Federal lands as a result of transmission tie-line operation, and significance thresholds associated with recreation would not be exceeded.

Zoning

The proposed transmission tie-line is not subject to local zoning requirements.

Applicable Land Use Plans

The proposed transmission tie-line is not located within a Wilderness Area, Research Natural Area, or the Elden Environmental Study Area, so would not cause direct land use impacts to these resources. The transmission tie-line would be consistent with the Forest Plan (the extent to which the transmission tie-line affects sensitive environmental resources is discussed under the Geology and Soils section and the Biological Resources section of this report). The proposed transmission tie-line is not subject to local jurisdictional authority as governed by the Coconino County Comprehensive Plan, but requires a CEC from the Arizona Corporation Commission. Foresight would obtain this certificate prior to beginning construction on any portion of the proposed transmission tie-line.

<u>Western's Switchyard</u>

Land Ownership and Jurisdiction

The proposed switchyard would be located on Federal land under the jurisdiction of the Forest Service, generally within the existing rights-of-way for the Glen Canyon-Pinnacle Peak transmission lines. Authorization for the use of lands for the proposed switchyard would be decided by the Forest Service.

Existing Land Use

The majority of the proposed switchyard would be located within the rights-of-way of the existing Glen Canyon-Pinnacle Peak transmission lines. Four additional towers would be added to the transmission lines to accommodate the interconnection, but neither the transmission lines nor their functions would be negatively affected by the modification. The switchyard would not create an unresolved conflict with existing utility rights-of-way, and land use significance standards would not be exceeded.

Grazing

The proposed switchyard is located within the Anderson Springs Grazing Allotment. Grazing occurs throughout the switchyard study area and would be allowed to continue once the switchyard is constructed and operating. The construction of the switchyard would result in the temporary loss of up to 24 acres of grazing land and the permanent removal of about 15 acres of land from grazing. This would result in a minimal loss of land available to grazing in the grazing allotment and would not affect the economic viability of the ranching operations and would not exceed the significance standards.

Recreation

Temporary impacts to recreation uses on Forest Service-managed lands would occur during the construction of the switchyard by limiting access to the construction area; however, hunting and other recreation uses would not be restricted on the Forest as a result of switchyard operation.

Zoning

The proposed switchyard is not subject to local zoning requirements.

Applicable Land Use Plans

The proposed switchyard is not located within a Wilderness Area, Research Natural Area, or the Elden Environmental Study Area, so it would not cause direct land use impacts to these resources. The switchyard would be located within an established utility corridor, consistent with the Forest Plan. Since the installation of the switchyard would be consistent with applicable land use plans, project impacts would be minimal and significance criteria would not be exceeded.

3.1.2.3 Alternative Transmission Tie-line Corridor

Impacts to land use associated with the construction and operation of the alternative transmission tie-line would be similar to those described for the proposed transmission tie-line. The alternative transmission tie-line would require the construction of a new access road over a distance of approximately three-quarter mile resulting in approximately one additional acre of temporary and permanent ground disturbance, slightly increasing the loss of land available for grazing. This new access road could lead to an increase in off-road recreation use on this particular portion of Forest Service-managed lands and could require that new access roads are signed or closed if illegal use becomes an issue. Potential land use impacts associated with the alternative transmission tie-line corridor would be minimal and would not exceed significance thresholds.

3.1.2.4 No Action Alternative

No direct impacts on existing or planned land uses or recreation opportunities would result through implementation of the No Action Alternative. Under this alternative, Western would not approve an interconnection for the Grapevine Canyon Wind Project, and the Forest Service would not issue a right-of-way for the transmission tie-line proposed for the wind park. The wind park, transmission tie-line, and switchyard would not be constructed and the land use and recreation resources of the area would remain unchanged.

3.2 BIOLOGICAL RESOURCES[2]

Biological resources within the evaluation area were evaluated through a search of existing data, including published literature, field guides, public data sets, and site visits. In addition, the USFWS, AGFD, and the Forest were contacted concerning the presence of sensitive species and habitats within the evaluation area. The Forest Service sensitive species lists for plants and wildlife were used for analysis of the transmission tie-line and switchyard portion of the project. Due to issues raised in scoping, raptors, bats, and big game species have been addressed individually. Biological concerns for development of commercial wind energy facilities has generally centered on collision risk of birds and bats with wind turbines, indirect effects due to habitat loss or alteration, and direct and indirect impacts to sensitive species (NAS 2007; Strickland et al. 2011).

This chapter relies on the following information sources: 1) habitat and biological evaluations conducted in 2009 by Western EcoSystems Technology, Inc. (WEST) (Tidhar and Chatfield 2010a, 2010b); 2) baseline avian and bat studies conducted on a large portion of the proposed wind park between 2007–2008 (Young et al. 2009) and during 2011 (Tidhar et al. 2011a, 2001b) and; 3) bird and bat study results

[2] The Biological Resources section was reorganized in the Final EIS and new content added, to respond to public comments received on the Draft EIS. New content has been marked with a vertical line in the left margin of the Final EIS. Text that has been moved is not indicated with a line in the left margin because it is not new or revised text.

from the nearby proposed Sunshine Wind Energy Project (WEST 2006; Gruver et al 2009). The Sunshine Wind Energy Project is located close to the wind park study area, contains similar species composition and habitats, and was studied using similar pre-construction survey methods. For the biological resources section, the wind park study area has been divided into three separate sub-study areas: Sub-study Area A, Sub-study Area B, and Sub-study Area C. The biological resources evaluation is comprised of three separate reports: a Wildlife and Botanical Report (Tidhar and Chatfield 2010b) for the proposed transmission tie-line right-of-way and switchyard that would be sited on Forest Service lands; a Site Characterization Report (Tidhar and Chatfield 2010a) for the proposed Grapevine Canyon Wind Resource Area (referred to in this EIS as the wind park study area which was divided into Sub-study Area A, Sub-study Area B, and Sub-study Area C by WEST in the Site Characterization Report); and a baseline wildlife survey report conducted by WEST in 2007 and 2008 within Sub-study Area A of the wind park study area (Young et al. 2009). These reports are included in Appendices D.1, D.2, and D.3 of this EIS. These reports address land cover and habitats; the potential for sensitive plants and wildlife to occur; the potential for avian migratory pathways, important biological features such as raptor nests, prey populations, and other biological resources; and results from baseline wildlife surveys completed within Sub-study Area A in 2007–2008. The primary objective of the surveys was to generate data on seasonal and annual use by birds and bats that would be useful in evaluating impacts from the proposed wind-energy facility. AGFD, USFWS, Forest Service, and Western biologists have reviewed and commented on the evaluation contained in the reports. Correspondence from USFWS and AGFD related to the reports is found in the Site Characterization Report (Appendix D.1). Based on these comments, information from these reports has been used to prepare this section of this EIS. Comments received on the Draft EIS have also been incorporated into this section.

3.2.1 Affected Environment

3.2.1.1 Resource Evaluation Area

The biological resources evaluation area consists of the proposed wind park study area (including Sub-study Area A, Sub-study Area B, and Sub-study Area C), the proposed site access road, a two-mile buffer around the wind park study area and site access road, and a one-mile buffer around the transmission tie-line and switchyard study area (Figure 3.2-1). Information used to evaluate the wind park study area and two-mile buffer comes directly from the Site Characterization Report (Appendix D.1). Within the Site Characterization Report, the wind park study area and buffer was titled Grapevine Canyon Wind Resource Area, a term not used in this EIS. In addition, the Site Characterization report divided the wind park study area into three separate areas depicted as Study Areas A, B, and C, which have been re-titled for the EIS to Sub-study Areas A, B, and C to minimize confusion about the term "study area." Information to evaluate the proposed transmission tie-line and switchyard is derived from the Wildlife and Botanical Report (Appendix D.2) in which the evaluation area is described as the transmission tie-line alignment and switchyard and a one-mile buffer of the proposed transmission tie-line alignment and switchyard site. This biological resources evaluation area includes all infrastructure including, but not limited to, WTGs, underground and potentially overhead electrical collection lines, roads, step-up substations, operations and maintenance facility buildings, 345-kV transmission tie-line, and Western's interconnection switchyard.

3.2.1.2 Characterization

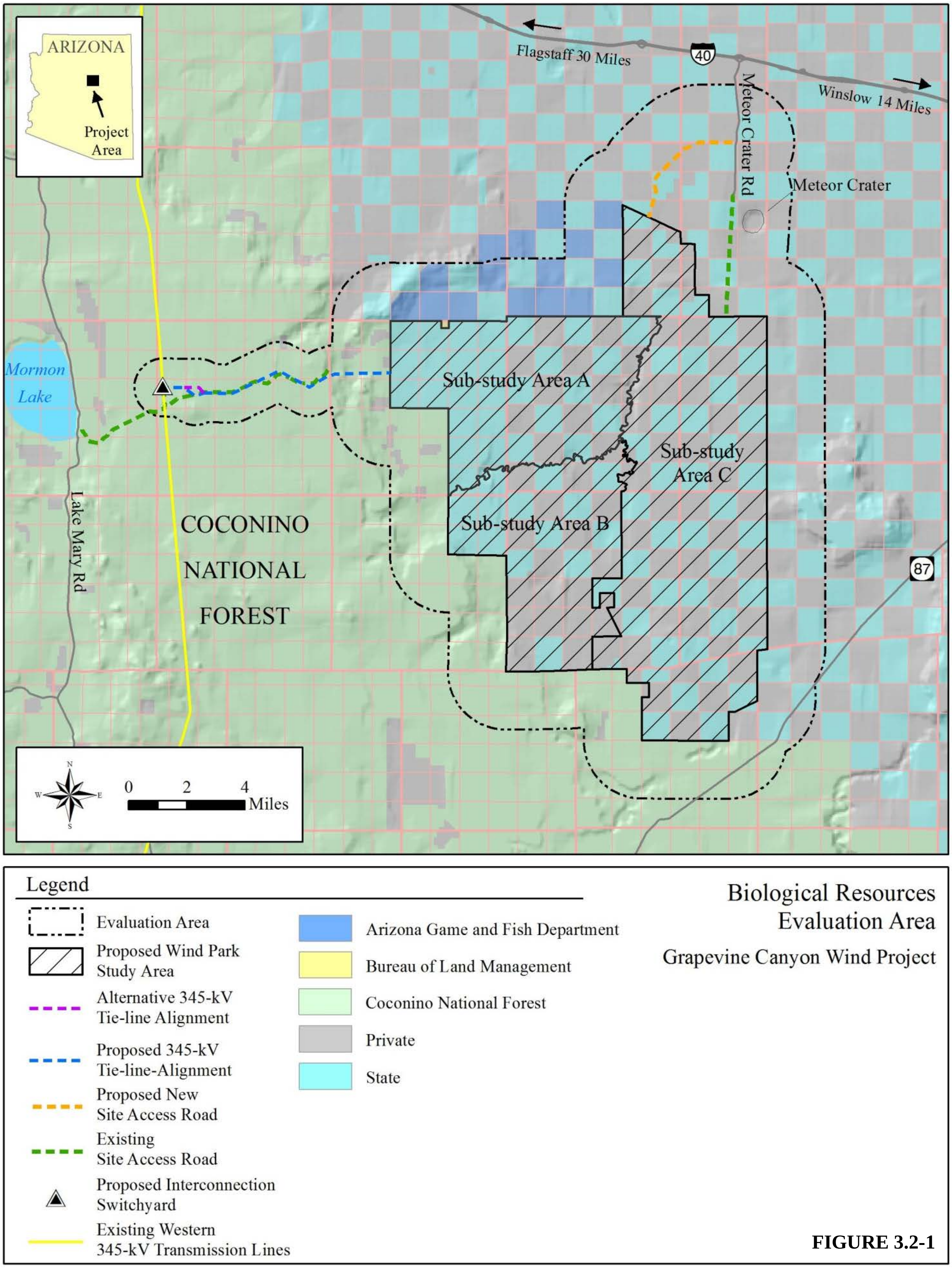
Environmental Setting

The biological resources evaluation area is located in the transition zone between the Arizona/New Mexico Plateau Ecoregion, which covers much of northern Arizona and northwestern New Mexico, and the higher elevation Arizona/New Mexico Mountain Ecoregion immediately to the west (EPA 2004).

The Plateau Ecoregion is a transitional region between the semiarid, low relief tablelands in the east; the drier, shrubland/woodland covered, higher relief tablelands in the Colorado Plateau; and the lower, hotter, less-vegetated Mojave Basin and Range in the east; and the Chihuahuan Desert in the south. Higher, more forested, mountainous ecoregions border the Arizona/New Mexico Plateau to the northeast and southwest. Vegetation communities in the region are characteristic of Great Basin shrublands and grasslands. Higher elevations within the region support pinyon pine (*Pinus edulis*) and juniper (*Juniperus* spp.) forests. Improper grazing management has caused widespread habitat degradation throughout much of the region. Lack of regular fires and high grazing pressure may have led to conversion of areas from native grassland to Great Basin desert scrub or Great Basin conifer woodland (AGFD 2006).

The Arizona/New Mexico Mountain Ecoregion lays immediately to the west of the existing Western 345-kV transmission lines. Chaparral is common on the lower elevation slopes of this ecoregion with pinyon-juniper and oak (*Quercus* spp.) woodlands found on lower and mid elevations and open to dense ponderosa pine (*Pinus ponderosa*) forests occur at higher elevations. Forests of spruce (*Picea* spp.), fir (*Abies* spp.), and Douglas fir (*Pseudotsuga menziensii*) are found in only a few high-elevation parts of the region and are not present within the evaluation area.

Topography within the evaluation area is generally very flat to gently sloping with the exception of a few low ridges and larger canyons with moderate to steep embankments or cliffs. The vast majority of the evaluation area is characterized by Great Basin shrubland and grassland. The vegetation transitions into areas of juniper savannah, pinyon-juniper woodland, and ponderosa pine forest as the western portion of the area extends onto the Anderson Mesa. Elevations range from approximately 5,410 to 7,480 feet above sea level.



Biological Resources Evaluation Area

Grapevine Canyon Wind Project

FIGURE 3.2-1

Land Cover

Land cover types for the biological resources evaluation area were analyzed using the USGS National Land Cover Database (NLCD) maps (USGS 2001) and site visits. The dominant cover types in the evaluation area are scrub-shrub and grassland. Other cover types include evergreen forest (comprised of ponderosa pine), woody wetlands, pinyon/juniper woodlands, barren land, cropland, pasture/hay fields, and developed open space. The evaluation area is based on the area included in the wind park study area for a potential project fully built out to 500 MW. Under that scenario, the evaluation area is approximately 123,355 acres of which the dominant cover type is scrub-shrub which comprises about 70 percent of the area. This land cover type comprises about 74 percent of the approximately 94,950-acre wind park study area. The only other major land cover type in the evaluation area and wind park study area is grassland, which comprises about 32,842 acres (18 percent) of the evaluation area and about 22,530 acres (24 percent) of the wind park study area. If the project is fully built out, then direct impacts to land (both permanent and temporary) would result in approximately 2,420 to 2,631 acres of land disturbance, which is less than 3 percent of the evaluation area.

According to NLCD maps, evergreen forest is primarily restricted to the northwest corner of Sub-study Area A of the wind park study area and along the western and southern boundary of Sub-study Area B. Land cover does not significantly differ among the three Sub-study areas of the project. Sub-study Area C is the largest of the three Sub-study areas, constituting approximately 49,470 acres, or 52 percent, of the overall wind park study area. Sub-study Area C contains slightly more grassland than the other Sub-study areas according to NLCD data. Sub-study Area A contains the largest amount of woody wetlands (about 69 acres) due to the greater proportion of canyons found within this area of the wind park study area as compared with Sub-study areas B or C.

The transmission tie-line right-of-way encompasses approximately 678 acres of which approximately 63 percent is grassland and 34 percent is pinyon-juniper woodland. The remaining area (less than three percent) is comprised of ponderosa pine forest. Plains grassland which covers the majority of the transmission tie-line alignment consists of a grass-forb association dominated by western wheatgrass (*Agropyron smithii*). Pinyon-juniper woodlands are composed of Utah juniper (*Juniperus osteosperma*) intermixed with varying amounts of pinyon pine. The proposed transmission tie-line transverses only a small amount of ponderosa pine habitat limited to two small areas in the western portion of the proposed transmission tie-line corridor and near the proposed Western switchyard. The areas of pine forest that would be impacted by the proposed transmission tie-line are located along the very edge of larger tracts of mature to intermediate-aged pure ponderosa pine forest to the south of the transmission tie-line. Habitat types found along the alternative transmission tie-line alignment are generally similar to those of the proposed transmission tie-line, except the alternative transmission tie-line alignment does not cross any ponderosa pine forests.

The access road is largely located within scrub-shrub and grassland typical of the surrounding area. Some scattered small rocky outcrops are sporadically located along or adjacent to the proposed route. The road crosses Diablo Canyon in a section of the canyon containing an existing natural crossing, in an area without natural canyon walls or large rock features. The crossing area is dominated by grassland and scrub-shrub vegetation common to the surrounding landscape. During a site visit conducted to assess the area in November 2009 no standing water nor perennial or ephemeral water features were evident.

Wetlands and Riparian Areas

Information on wetlands and waterbodies was obtained from National Wetland Inventory data USFWS 2004). Wetland delineations were performed in consultation with the USACE, and the appropriate Section 404 permit would be obtained prior to project construction. Anderson Mesa contains a network of small seasonal wetlands which contain water following periods of monsoon rainfall or Winter snowfall, and provide habitat for a diversity of waterfowl and other wildlife and plant species. Several small lakes, including Pine Lake and Yaeger Lake, are present within the evaluation area. Larger waterways include Jack's Canyon, Canyon Diablo, Grapevine Canyon, and Yaeger Canyon. These canyons generally do not hold water year-round, although water is present in some canyon bottom locations year-round, indicating the presence of ephemeral springs. Livestock drinkers and earthen stock ponds are also present throughout the evaluation area, however, little to no natural wetland vegetation is present in these areas.

Invasive and Non-native Plant Species

The State of Arizona has laws addressing the control and eradication of noxious weeds and identifying specific species that fall under noxious weed definitions (A.A.C. R3-4-244 and 245). Noxious weeds and other non-native plant species typically associated with rangeland are currently found within the biological resources evaluation area. Noxious and invasive weeds are defined as "those plant species designated as noxious and invasive weeds by the Secretary of Agriculture or by the responsible state official." Noxious and invasive weeds generally possess one or more of the following characteristics: "aggressive and difficult to manage, poisonous or toxic, parasitic, a carrier or host of serious insects or disease, and being non-native or new to or not common to the United States or parts thereof" (Forest Service 1995a). Although the project area was not surveyed for noxious and invasive weeds, Scotch thistle, Russian knapweed, diffuse knapweed, bull thistle, and Dalmatian toadflax are likely to occur in the biological resources evaluation area.

Special Status Species

Special status plants and wildlife habitat and distribution information were reviewed and species were assessed for potential of occurrence within the biological resources evaluation area qualitatively along a scale ranging from no potential for occurrence ("none") to highest probability for occurrence ("high"). Rank classifications and definitions used for qualitative assessment for probability of occurrence are as follows (Tidhar and Chatfield 2010a and 2010b):

- None – No potential for occurrence. Known range and distribution do not overlap the project evaluation area. Potential habitat completely absent from the evaluation area. No species accounts for the evaluation area or surrounding area exist.
- Extremely Low – Extremely low probability of occurrence. Known range and distribution may not include the evaluation area. Very limited potential habitat is available within the evaluation area. No species accounts for the evaluation area or surrounding area exist.
- Low – Low probability of occurrence. Known range and distribution include the evaluation area. Potential habitat available patchily or in isolated areas within the evaluation area. No species accounts for the evaluation area or surrounding area exist.
- Moderate – Moderate probability of occurrence. Range and distribution include the evaluation area. Habitat present within the evaluation area. Species accounts for the evaluation area or surrounding area may exist.
- High – Highest probability of occurrence. Range and distribution overlap the evaluation area. Habitat abundant within the evaluation area. Species accounts exist for the evaluation area.

Special Status Plant Species

Federal- and State-listed plant species recorded for Coconino County within the biological resources evaluation area were obtained from the USFWS (2009b) and AGFD (2009h). The Forest Service list of threatened, endangered, and sensitive plant species for the Mormon Lake and Peaks Ranger Districts in the Forest was used to evaluate species for the transmission tie-line and switchyard elements on Forest land.

Threatened, Endangered, and Sensitive Plant Species (Wind Park)

The USFWS lists seven plant species designated as endangered, threatened, or candidate species with known or potential occurrence in Coconino County (Appendix D.1, Table 2.3). Additionally, the AGFD lists six plants as Federal species of concern and one Federally-listed threatened species as having documented presence at the watershed level within the Canyon Diablo and/or Middle Little Colorado Watersheds (Appendix D.1, Table 2.4), which encompass the biological resources evaluation area (AGFD 2009h). None of these plants have been documented as occurring within the wind park study area; however, it is possible that rare plant surveys have never been conducted in the area. Due to a very limited distribution and/or specific habitat requirements, only one species, the Peebles Navajo cactus (*Pediocaactus peeblesianus* var. *peeblesianus*) has a moderate potential to occur with Sub-study Areas A, B, and C. No other Federal threatened, endangered, or sensitive plant species are known to occur within or immediately adjacent to the wind park study area.

The AGFD also lists 16 State sensitive plant species with documented occurrence in the Canyon Diablo and/or Middle Little Colorado Watersheds. Of these 16, six species (blumer's dock [*Rumex orthoneurus*], gladiator milk-vetch [*Astragalus xiphoides*], Mogollon thistle [*Cirsium parryi mogollonicum*], paper-spined cactus [*Pediocactus papyracanthus*], Peebles Navajo cactus, and San Francisco Peaks groundsel [*Senecio franciscanus*]) are also listed as Federal threatened or endangered species or Federal species of concern by the USFWS. The Site Characterization Report (Appendix D.1) provides a list of all these species, as well as status, habitat information, and analysis of potential to occur. Other than the Peebles Navajo cactus, the wind park study area contains relatively low diversity, and due to a limited distribution and/or specific habitat requirements, the State-listed species are not expected to occur in the biological resources evaluation area.

Threatened, Endangered, and Sensitive Plant Species (Transmission Tie-Line and Switchyard)

The Forest Service has compiled a list of 14 threatened, endangered, and sensitive plant species for the Mormon Lake and Peaks Ranger Districts in the Forest. The Wildlife and Botanical Report (Appendix D.2, Table 3.2) provides a list of these species, as well as status, habitat information, and analysis of potential to occur within a one-mile evaluation area of the transmission tie-line and switchyard. Due to a very limited distribution, and/or specific habitat requirements, 13 of the species have no potential to occur within or immediately adjacent to the transmission tie-line alignment. One species has extremely low potential for occurrence (Flagstaff beardtongue [*Penstemon nudiflorus*]) within or immediately adjacent to the transmission tie-line alignment. Among the 14 sensitive plant species recorded within the Forest District, the Forest Service determined that suitable habitat is present only for Flagstaff beardtongue (Forest Service 2009). The proposed switchyard area does not contain suitable habitat for Flagstaff beardtongue.

Within the one-mile evaluation area, suitable habitat exists for four species: Arizona bugbane (*Cimicifuga arizonica*, Extremely Low), Arizona sneezeweed (*Helenium arizonicum*, Moderate), Arizona sunflower (*Helianthus arizonensis*, Extremely Low), Bebb's Willow (*Salix bebbiana*, Moderate). While there is moderate potential for Bebb's willow to occur within one mile of the transmission tie-line and switchyard, there is no potential for the species to be located immediately adjacent to the transmission tie-line and switchyard due to the absence of suitable habitat.

Special Status Wildlife Species

All Federal- and State-listed species recorded for Coconino County and/or considered by the USFWS (2009b) or AGFD (2009h) to have the potential for occurrence within the county were evaluated for the biological resources evaluation area (Appendix D.1 and D.2) and are summarized in Table 3.2-1. For classifications of potential for occurrence, AGFD maintains distribution lists for sensitive species at the watershed level, and these data were also incorporated into the analyses. Classifications for birds include potential for occurrence for nesting as well as presence, while other wildlife was classified for presence. The Forest Service list of special-status wildlife species on the Mormon Lake and Peaks Ranger Districts in the Forest was used to evaluate species for the transmission tie-line and switchyard. This list includes Federal threatened, endangered, and candidate wildlife species; Arizona State wildlife of special concern; Forest Service sensitive wildlife species; Forest Service Management Indicator Species (MIS); and migratory birds. Species habitat and distribution information available from published reports and publicly available data sets were reviewed. Species were ranked for potential of occurrence using the same scale used for special status plant species.

TABLE 3.2-1
THREATENED, ENDANGERED, AND SENSITIVE WILDLIFE SPECIES
THAT MAY OCCUR IN THE BIOLOGICAL RESOURCES EVALUATION AREA

Species	Status[1]	Potential to Occur – Wind Park Study Area[A]	Potential to Occur – Transmission Tie-Line or Switchyard[B]
BIRDS			
American peregrine falcon *Falco peregrinus anatum*	FSC, WSC, SEN	Extremely Low (nesting) Moderate (presence)	None (nesting) Moderate (presence)
Bald eagle *Haliaeetus leucocephalus*	WSC, SEN, BGEPA	None (nesting) Low (presence)	None (nesting) Moderate (presence)
Belted kingfisher *Megaceryle alcyon*	WSC	None (nesting) Extremely Low (presence)	None (nesting or presence)
California condor *Gymnogyps californianus*	FE/ NE	None (nesting) Extremely Low (presence)	None (nesting or presence).
Clark's grebe *Aechmophorus clarkia*	WSC, SEN	None (nesting) Extremely Low (presence)	Moderate (nesting) Moderate (presence)
Ferruginous hawk *Buteo regalis*	WSC	Extremely Low (nesting or presence)	None (nesting or presence)
Golden Eagle *Aquila chrysaetos*	BGEPA	High (nesting) High (presence)	Low (nesting) Low (presence)
Mexican spotted owl *Strix occidentalis lucida*	FT/WSC/SEN	None (nesting) Extremely Low (presence).	None (Nesting), Extremely Low (Presence)
Northern goshawk *Accipiter gentilis*	FSC, WSC, SEN	Extremely Low (nesting) Low (presence)	Extremely Low (nesting) Moderate (presence)
Osprey *Pandion haliaetus*	WSC	None (nesting) Extremely Low (presence)	None (nesting) Extremely Low (presence)
Southwestern willow flycatcher *Empidonax traillii extimus*	FE	Extremely Low (nesting or presence)	None (nesting or presence).
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FC	None (nesting) Extremely Low (presence)	None (nesting or presence).
MAMMALS			
Allen's lappet-browed bat *Idionycteris phyllotis*	FSC, SEN	High	High (presence)
Black-footed ferret *Mustela nigripes*	FE/NE	None	None
Greater western mastiff bat *Eumops perotis californicus*	FSC, SEN	None	High
Merriam's shrew *Sorex merriami leucogenys*	SEN	N/A	Low

TABLE 3.2-1 THREATENED, ENDANGERED, AND SENSITIVE WILDLIFE SPECIES THAT MAY OCCUR IN THE BIOLOGICAL RESOURCES EVALUATION AREA			
Species	**Status[1]**	**Potential to Occur – Wind Park Study Area[A]**	**Potential to Occur – Transmission Tie-Line or Switchyard[B]**
Navajo Mexican vole *Microtus mexicanus navaho*	WSC	Low	None
Navajo Mogollon vole *Microtus mogollonensis Navaho*	SEN	N/A	Low
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*	FSC, SEN	None	Low
Spotted bat *Euderma maculatum*	FSC, WSC, SEN	None	Low
REPTILES			
narrow-headed gartersnake *Thamnophis rufipunctatus*	WSC	None	None
Northern Mexican gartersnake *Thamnophis eques megalops*	FC	None	None
AMPHIBIANS			
Chiricahua leopard frog *Rana chiricahuensis*	FT	None	None
Northern leopard frog *Rana pipiens*	WSC, SEN	None	Low
FISH			
Apache trout *Oncorhynchus apache*	FT	None	None
Humpback chub *Gila cypha*	FE	None	None
Little Colorado spinedace *Lepidomeda vittata*	FT, WSC	None	None
Little Colorado sucker *Catostomus* sp. *3*	WSC	Low	None
Razorback sucker *Xyrauchen texanus*	FE	None	None
Roundtail chub *Gila robusta*	FC	None	None
INVERTEBRATES			
Kanab ambersnail *Oxyloma haydeni kanabensis*	FE	None	None

[A]Within two miles of the wind park study area.
[B]Winthin one mile of the transmission tie-line and switchyard.
[1] FE = Federal Endangered; FT = Federal Threatened; FC = Federal Candidate; FSC = Federal Species of Concern; NE = Nonessential Experimental Population; WSC = Arizona State Wildlife of Special Concern; SEN = Forest Service sensitive species; BGEPA = Species protected by the Bald and Golden Eagle Protection Act.

Federal Threatened and Endangered Wildlife Species (Wind Park)

The Site Characterization Report (Appendix D.1, Table 3.3) provides a list of all the Federal threatened, endangered, and candidate wildlife species as well as status, habitat information, and analysis of potential to occur for the wind park study area, access road, and two-mile buffer. Thirteen wildlife species listed as endangered, threatened, candidate, or non-essential experimental special status species by the Federal ESA occur within Coconino County, Arizona, including four birds, one mammal, one reptile, one amphibian, five fish, and one snail. The majority of these species are not expected to occur in the wind park study area. The California condor (*Gymnogyps californianus*), southwestern willow flycatcher (*Empidonax traillii extimus*), and the yellow-billed cuckoo (*Coccyzus americanus occidentalis*) all have an extremely low potential to occur within or adjacent to the wind park study area, but may disperse or move through portions of the area. Mexican spotted owls are known to occur in the forested mountains and canyons west and south of the wind park study area and evaluation areas (AGFD 2009b) and may also move through the area; however, suitable nesting habitat is not present within or immediately adjacent to the proposed wind park, and there is no probability of nesting within or adjacent to the wind park study area.

The USFWS provided comments to the Draft EIS stating that the northern Mexican gartersnake (*Thamnophis eques megalops*), listed as a Federal species of concern, and the Chiricahua leopard frog (*Rana chiricahuensis*), listed as a Federal threatened species, are not believed to occur within the wind park study area or be affected by the project.

Federal Threatened or Endangered Wildlife Species (Transmission Tie-Line and Switchyard)

Thirteen wildlife species listed as endangered, threatened, candidate, or non-essential experimental special status species by the Federal ESA occur within Coconino County, Arizona, including four birds, one mammal, one reptile, one amphibian, five fish, and one snail. The majority of these species are not expected to occur within the transmission tie-line evaluation area. Mexican spotted owls are known to occur in the Forest in the vicinity of the transmission tie-line, and while the species move through the area, suitable nesting habitat is not present within or immediately adjacent to the proposed transmission tie-line evaluation area. The USFWS provided comments to the Draft EIS stating that Mexican gartersnake and Chricahua leopard frog are not believed to occur or be affected by the project.

Bald and Golden Eagles

Surveys for bald and golden eagle nests were completed within a 10-mile buffer of all project components (wind park study area, transmission tie-line, switchyard, access road) during Spring 2011 (Tidhar et al. 2011a). Previous nest surveys were completed within a two-mile buffer of Sub-study Area A in 2008 (Young et al. 2009). Avian use surveys, designed to document presence and measure use of birds including eagles, were conducted during 2008–2009 within Sub-Study Area A (Young et al 2009) and are currently underway throughout the wind park study area.

<u>Bald Eagles (Wind Park)</u> – Breeding bald eagles are found near large lakes, reservoirs, or perennial streams throughout central Arizona where they perch in large riparian trees, pines, or on cliffs (Corman and Wise-Gervais 2005). No bald eagle breeding habitat exists within the wind park study area. Raptor nest surveys completed during 2008 did not document any bald eagle nests within two miles of Sub-study Area A (Young et al. 2009), and Spring 2011 surveys within 10 miles of all project components also did not document any bald eagle nests (Tidhar et al. 2011a). During consultation, AGFD indicated the closest breeding territory for the species is located over 15 miles from the wind park study area. There is the potential for over-wintering or migrating eagles to occur over the wind park study area. Bald eagles have been observed at the Raymond Wildlife Area, which is located to the north and west of the wind park

study area (AGFD 2009g). However, during a total of 444 twenty-minute fixed point avian use surveys completed in 2007 and 2008 at Sub-study Area A of the wind park study area, a total of two bald eagles were observed. One individual was sighted during the Winter and one individual was sighted during the Spring (Young et al. 2009). These bald eagles were likely overflying the wind park study area to or from over-wintering range. This low level of use observed during fixed-point surveys does not suggest that the wind park study area is located in an area frequented by bald eagles during any season.

<u>Bald Eagles (Transmission Tie-Line and Switchyard)</u> – Historically, bald eagles have nested along the Mogollon Rim (AGFD 2009e) within 3.5 miles of the proposed transmission tie-line right-of-way. No bald eagle nests were observed during Spring 2011 raptor nest surveys (Tidhar et al. 2011a). Based on unpublished data provided by the AGFD in May 2011, the nearest known bald eagle breeding area nest site recorded over recent years is located greater than ten miles away from the switchyard or transmission tie-line. Wintering or transient bald eagles are known to occur in the vicinity of the transmission tie-line alignment and switchyard site. Mormon Lake and Upper and Lower Lake Mary are important foraging and roosting areas for wintering bald eagles. There is no potential for the species to nest in the vicinity of the transmission tie-line or switchyard, but the bald eagle could be a transient visitor through the transmission tie-line alignment or switchyard area.

<u>Golden Eagles (Wind Park)</u> – During raptor nest surveys completed during Spring 2011, one active golden eagle nest was observed approximately four miles from the wind park study area (Tidhar et al. 2011a). Canyon edges represent the best available nesting structures for golden eagles within the wind park study area. Open grasslands, desert scrublands, and pinyon-juniper woodlands have low potential for nesting golden eagles. Consequently, there is low potential for the species to nest within large portions of the wind park study area. There is the potential for golden eagles to occur over the Grapevine wind park study area year-round. During a total of 444 twenty-minute fixed point avian use surveys completed in 2007 and 2008 at Grapevine Sub-study Area A, a total of eight golden eagles were observed (Young et al. 2009). Four individuals were sighted during the Fall, two were sighted during the Summer, and one was sighted during Winter and Spring. This low level of use was not strongly correlated with any particular portion of the Sub-study area, nor was it the result of a locally active breeding territory, based on raptor nest surveys completed during 2008 (Young et al. 2009). Although formal raptor nest surveys were not conducted at the nearby proposed Sunshine Wind Project, only one golden eagle was observed during 2005–2006 year-round pre-construction avian use surveys (WEST 2006).

Studies have been completed to document the availability of concentrated/colonial prey availability within the wind park study area. Two active and one inactive Gunnison's prairie dog colonies were mapped during baseline wildlife studies conducted in Sub-study Area A (Young et al. 2009) and information from the AGFD received on May 4, 2010 on regional prairie dog colonies was reviewed (Tidhar and Chatfield 2010a). Additional surveys to map and assess the status of prairie dog colonies within the wind park Sub-study areas A, B and C were completed between June and August 2011. Overall, less than 1 percent (766.4 acres) of the wind park study area overlaps active (697.3) and inactive (69.1 acres) prairie dog towns (Figure 3.2-3).

<u>Golden Eagles (Transmission Tie-Line and Switchyard):</u> Few potential nest structures exist for the species within the immediate vicinity of the transmission tie-line or switchyard based on the results of 2010 habitat assessments (Tidhar et al 2010b). This study, in addition to aerial reconnaissance and prey mapping conducted during 2011, documented low prey availability within one mile of the transmission tie-line and switchyard relative to other areas included in the study areas (Tidhar and Chatfield 2010b; Tidhar et al. 2011a). Based on the results of the 2011 raptor nest surveys, no golden eagle nest sites are located in the vicinity of the transmission tie-line or switchyard (Tidhar et al. 2011a). Low numbers of golden eagles may transient or overfly the transmission tie-line and switchyard. Information on year-round avian use collected in Sub-Study Area A of the wind park study area (Young et al. 2009) and at the

Sunshine Wind Park (WEST 2006) indicates relatively low golden eagle use in the region. Those studies did not document high raptor migration activity overall or high golden eagle migration activity.

Other Sensitive Wildlife Species (Wind Park)

The AGFD lists 14 wildlife species as State species of special concern with documented presence within the Canyon Diablo and/or Middle Little Colorado Watersheds. The Site Characterization Report (Appendix D.1, Table 3.3) provides a list of all these species, as well as status, habitat information, and analysis of potential to occur. These State species of special concern include seven birds, one mammal, two reptiles, two amphibians, and two fish. The northern goshawk (*Accipiter gentilis*), Navajo Mexican vole (*Microtis mexicanus navaho*), northern leopard frog (*Lithobates pipiens*), northern Mexican gartersnake, Chiricahua leopard frog, and Little Colorado sucker (*Catostomus* sp.) all have a low potential to occur in the wind park study area. All other State species of special concern have extremely low or no potential to occur within or adjacent to the wind park study area.

Peregrine falcons may occur as a rare Winter visitor or migrant through the wind park study area. No known records exist within five miles of the wind park study area (AGFD and USFWS Correspondence, Appendix D.1). While there is no suitable bald eagle nesting habitat within the wind park study area, there is some potential for wintering or transient bald eagles to occur. There is some potential for goshawks to occur within the patches of ponderosa pine forest located within the wind park study area; however, very limited ponderosa pine forest is present within the evaluation area, and these patches are small in size and are not undisturbed relative to the surrounding landscape. Additionally, no goshawks were observed during baseline avian surveys conducted at either the Grapevine Sub-study Area A (Young et al. 2008) or Sunshine Wind (WEST 2006) studies, and there are no records within five miles of the wind park study area (AGFD and USFWS Correspondence, Appendix D.1). There is low potential for the northern leopard frog to occur in this area primarily because wetland habitat is limited throughout the wind park study area (Tidhar and Chatfield 2010b).

The Little Colorado sucker occurs in creeks, small to medium rivers, and impoundments having pools with abundant cover. According to Heritage Data Management System, the species has been documented in drainages within five miles to the south and southeast of the wind park study area (AGFD and USFWS Correspondence, Site Characterization Report, Appendix D.1). There is some potential for the Little Colorado sucker to occur in several of the larger drainages or springs within the biological resources evaluation area, particularly within Canyon Diablo, Grapevine Canyon, or Jack’s Canyon.

The Navajo Mexican vole is found in a wide range of vegetation communities from Great Basin desert scrub and Great Basin woodland to Rocky Mountain montane and subalpine forests. In Coconino County, the species is known to occur on the south rim of the Grand Canyon and approximately 20 miles west of the wind park study area in Walnut Canyon National Monument (AGFD 2009e). Shrub, grassland, and juniper woodland habitats are present within the wind park study area, thus there is potential for the Navajo Mexican vole to occur.

Other Sensitive Wildlife Species (Transmission Tie-Line and Switchyard)

Based on information provided by the Forest, 22 special status wildlife species occur on the Mormon Lake and Peaks Ranger Districts, which encompass the biological resources evaluation area for the transmission tie-line and switchyard. The Wildlife and Botanical Report (Appendix D.2) provides a list of all these species, as well as status, habitat information, and analysis of potential to occur in the vicinity of the transmission tie-line and switchyard. Those species with a low, moderate, or high potential to occur within the transmission tie-line evaluation area are listed in Table 3.2-1. Eleven of these species may occur and/or have suitable habitat within a one-mile buffer of the transmission tie-line and switchyard evaluation area, while only three may occur within the transmission tie-line right-of-way or switchyard.

The American peregrine falcon is generally found in open country with tall cliffs for roosting or nesting and with open water, woodland, or riparian areas nearby that support abundant avian prey species. The species is unlikely to nest within the transmission tie-line right-of-way due to the lack of suitable cliffs for nesting. Peregrines are regularly observed foraging at wetlands on the Anderson Mesa, and there is potential for peregrines to forage at the lakes within one mile of the transmission tie-line. As a result, the peregrine could be a transient visitor across or through the transmission tie-line alignment or switchyard area while traveling between foraging areas or during migration.

Allen's lappet-browed bat primarily inhabits ponderosa pine, pinyon-juniper, and pine-oak woodlands and riparian areas of sycamore (*Platanus wrightii*), cottonwood (*Populus* spp.), and willow (*Salix* spp.). Maternity colonies and roosts have been found in caves, abandoned mines, rock piles, and beneath the loose bark of large ponderosa pine snags (BCI 2009). This species has been documented within the Canyon Diablo Watershed (AGFD 2009h) in which the transmission tie-line and switchyard are planned. Suitable woodland habitat for foraging is present in the vicinity of the transmission tie-line; however, there is extremely low potential for the species to breed within the area. The species has a high potential to occur during the migration or maternity seasons, either for foraging or in transit, and is wide-ranging and capable of flying long distances of up to 20 miles.

The greater western mastiff bat (*Eumops perotis californicus*) is considered a year-round resident in Arizona; however, within the State it is uncertain whether or not the species hibernates in Winter (AGFD 2009b). The greater western mastiff bat typically occurs in lower and upper Sonoran desertscrub habitats near cliffs. They prefer rugged rocky canyons with abundant crevices, often crowding into tight crevices to roost. They can roost singly or in small groups, but more frequently form colonies of up to 100 individuals (AGFD 2009b). Greater western mastiff bats have very long, narrow wings which make launching difficult. For this reason, they regularly use roosts allowing a vertical drop of at least 10 feet. For the same reason, they are severely limited by available drinking water and are precluded from drinking at ponds less than 100 feet in length (BCI 2009). Roosting habitat in cliffs is generally absent; however, suitable cliff habitat may be available within canyons and along cliffs east of the transmission tie-line. Additionally, the species may forage at larger ponds within the biological resources evaluation area and surrounding region and may transit over the transmission tie-line. The greater western mastiff bat has been documented by the AGFD (2009a) as occurring within the Canyon Diablo Watershed in which the project area occurs, and there is high potential for the species to be present in the region.

Merriam's shrews are associated with sagebrush throughout their range. In Arizona, specimens have been found in or near open ponderosa pine woodlands, spruce-fir stands, and grasslands with patches of aspen and spruce. Of these habitat types, there exists an extremely small area of ponderosa pine forest within the evaluation area, and no records for the species exist within the study area; therefore, the species has been ranked as having a low probability for occurrence.

Pale Townsend's big-eared bat is widespread in Arizona. They typically occur in arid desert scrub habitats up to woodlands and coniferous forests. There is no potential for the species to occur during breeding or over-wintering seasons due to the lack of suitable roost sites or hibernacula. The species is widespread and likely forages at wetlands, ponds, and lakes and, therefore, the potential for occurrence in the vicinity of the transmission tie-line is considered low for foraging and/or migrating bats.

Forest Service Management Indicator Species (Transmission Tie-line and Switchyard)

Forest Service MIS were evaluated for the transmission tie-line, alternative transmission tie-line and switchyard only. The Coconino National Forest Plan identifies 17 MIS defined as

> *...plants or animals whose population change reflects a population change in other species within a group. MIS respond to habitat changes early or at low levels of stress and, therefore, are sensors of the effect of management activities that occur in various habitat"* (Forest Service 2002).

As such, MIS were selected to serve as a benchmark for potential effects of management actions on other species within the particular habitat type for which they were chosen. The Wildlife and Botanical Report (Appendix D.2, Table 3.4) provides a list of these 17 species, as well as habitat information and analysis of potential to occur within the transmission tie-line, alternative transmission tie-line route, and switchyard ("tie-line components") portion of the project. Nine may occur along transmission tie-line and switchyard components and are presented in Table 3.2-2.

TABLE 3.2-2
COCONINO NATIONAL FOREST MANAGEMENT INDICATOR SPECIES WITH THE POTENTIAL TO OCCUR IN THE TRANSMISSION TIE-LINE AND SWITCHYARD PORTION OF THE PROJECT

Species	**Potential to Occur within Transmission Tie-line Alignment or Switchyard**	**Potential to Occur within One Mile of Transmission Tie-line Alignment or Switchyard**
BIRDS		
Cinnamon teal *Anas cyanoptera*	None	High
Hairy woodpecker *Picoides villosus*	Low	High
Juniper titmouse *Baeolophus griseus*	High	High
Pygmy nuthatch *Sitta pygmaea*	Low	High
Wild turkey *Meleagris gallopavo merriamii*	Low	Moderate
MAMMALS		
Abert squirrel *Scirurus aberti*	Low	High
Elk *Cervus elaphus*	Moderate	High
Mule deer *Odocoileus hemonius*	High	High
Pronghorn antelope *Antilocapra americana americana*	High	High

Wildlife Common to the Wind Park, Transmission Tie-line, and Switchyard

Several biological resources, including raptors, migratory and breeding birds, bats, and big game, are similar throughout the wind park, transmission tie-line, and switchyard evaluation areas. These species common to the wind park, transmission tie-line, and switchyard are described below.

Raptors

Raptor information was collected from the Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005) and Sibley (2001). Seventeen diurnal raptor species have the potential to occur as residents and/or migrants in the wind park study area at some point during the year. In addition, one species of vulture and five species of owls occur in the region. Of the 17 diurnal raptors with the potential to occur in the project area, 6 species have the potential to nest or reside year-round: sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), red-tailed hawk (*Buteo jamaicensis*), golden eagle, American kestrel (*Falco sparverius*), and prairie falcon (*Falco mexicanus*). Three species may occur as Winter residents and/or migrants: northern harrier (*Circus cyaneus*), ferruginous hawk, and rough-legged hawk (*Buteo lagopus*). Eight species are not likely to reside in the area due to specific habitat requirements, but may pass through as migrants and/or occasional visitors from the surrounding region: zone-tailed hawk (*Buteo albonontatus*), Swainson's hawk (*Buteo swainsonii*), northern goshawk, common black hawk (*Buteogallus anthracinus*), bald eagle, osprey (*Pandion haliaetus*), peregrine falcon, and merlin (*Falco columbarius*). Additionally, turkey vultures (*Cathartes aura*) are likely Summer residents. Of the diurnal raptors and vultures potentially occurring, six species are considered wildlife of special concern by the AGFD (2009a): northern goshawk, common black hawk, ferruginous hawk, bald eagle, osprey, and peregrine falcon. Bald eagle, ferruginous hawk, and sharp-shinned hawk have been documented within the Raymond Wildlife Area immediately to the north and west of the wind park study area (AGFD 2009e), though State natural heritage records from within five miles of the transmission tie-line evaluation area include only the bald eagle (Appendix D.1).

Five owl species have the potential to nest or reside year-round within the wind park study area: barn owl (*Tyto alba*), long-eared owl (*Asio otus*), burrowing owl (*Athene cunicularia*), great horned owl (*Bubo virginianus*), and western screech-owl (*Megascops kennicottii*). Of the owl species potentially occurring within the wind park study area, burrowing owls are considered a species of concern by the USFWS and a Forest Service sensitive species and have been observed at the Raymond Wildlife Area (AGFD 2009e). Limited portions of the transmission tie-line (16 acres) have some potential to support nesting northern saw-whet owl (*Aegolius acadicus*), northern pygmy owl (*Glaucidium gnoma*), and flammulated owl (*Otus flammeolus*) due to the presence of potential breeding and foraging habitat in the form of ponderosa pine forest at higher elevations.

During baseline wildlife studies at Sub-study Area A (Young et al. 2008), 10 raptor species were observed either as residents or during migration: Cooper's hawk, sharp-shined hawk, red-tailed hawk, northern harrier, bald eagle, golden eagle, American kestrel, merlin, prairie falcon, and burrowing owl. Raptor species richness may be less in portions of Sub-study areas B and C, which contain greater proportions of grassland and desert scrub. This difference is suggested by avian survey results conducted at the nearby proposed Sunshine Wind Park where fewer species (six) were sighted (WEST 2006). Similarly, abundance of raptors is likely to be less in open grassland or desert scrub areas where nesting and roost structures are less abundant and prey density is lower (Tidhar et al. 2011a). Avian use surveys conducted at nearby proposed Sunshine Wind Project indicate lower abundance of raptors, particularly for golden eagle, relative to surveys conducted at the Sub-study Area A (WEST 2006; Young et al. 2009).

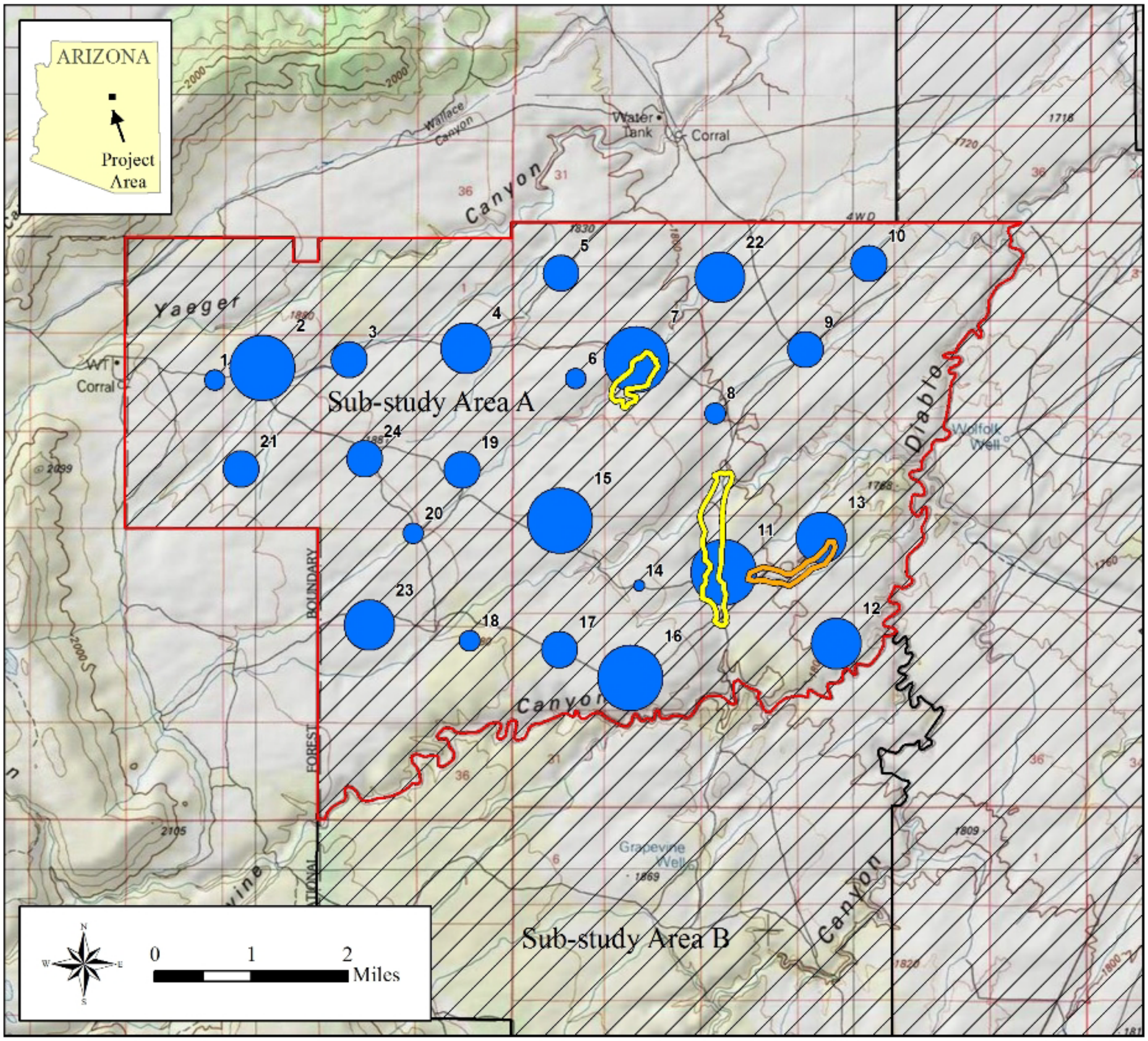
<u>Potential Raptor Nesting Habitat</u> – Potential nesting habitat for raptors is located primarily along the major drainages within the wind park study area: Canyon Diablo, Grapevine Canyon, Yaeger Canyon, and Jack's Canyon. Stands of oak and cottonwood in the canyon bottoms, as well as canyon walls and rock outcroppings, may potentially provide nest sites for raptors such as golden eagles, red-tailed hawks, American kestrels, prairie falcons, barn owls, and great horned owls. Additionally, small areas of pinyon-juniper woodland, juniper savannah, and ponderosa pine forest, particularly in western portions of Sub-study areas A and B, may also provide nest structures for raptors. Open, grassland habitats for ground-nesting species, such as burrowing owl, are present throughout the wind park study area, especially within

Gunnison's prairie dog (*Cynomys gunnisoni*) colonies which have been documented in the wind park study area (Young et al. 2009; Tidhar and Chatfield 2010a). More extensive stands of ponderosa pine and pinyon-juniper forests are present within the western portion of the transmission tie-line evaluation area, and there is some potential for forest-dwelling raptors, such as northern goshawk, Cooper's hawk, sharp-shinned hawk, western screech-owl, northern saw-whet owl, northern pygmy owl, and flammulated owl, to occur in these areas.

During raptor nest surveys completed within a two-mile buffer of Sub-study Area A of the project in 2008, one active/occupied red-tailed hawk nest was observed and two unoccupied golden eagle nests were observed within Grapevine Canyon (Young et al. 2009). During raptor nest surveys completed within a 10-mile buffer of all project components during 2011, one active golden eagle nest was observed and several unoccupied golden eagle, red-tailed hawk, unidentified buteo, and unidentified stick nests were observed (Tidhar et al. 2011a). A single occupied red-tailed hawk nesting territory and nest site was documented adjacent to Corner Lake approximately one mile from the proposed transmission tie-line and 1.3 miles from the transmission tie-line alternative (Tidhar and Chatfield 2010b). No raptor nests were located along or within approximately 0.25 mile of the transmission tie-line route during a site visit completed during Summer 2009 (Tidhar and Chatfield 2010b). No raptor nests were documented within 0.5 mile of the transmission tie-line during raptor nest surveys completed during Spring 2011 (Tidhar et al. 2011a). Given the proximity of an existing road and general lack of optimal nest structures the likelihood of nesting raptors to occur in, or proximate to, the transmission tie-line is low.

<u>Areas of Potentially High Prey Density</u> – Two active and one inactive Gunnison's prairie dog colonies were mapped during 2007–2008 baseline wildlife studies conducted in Sub-study Area A (Figure 3.2-2) (Young et al. 2009), and information from the AGFD on regional prairie dog colonies was obtained (Tidhar and Chatfield 2010a). Additional surveys to map and assess the status of prairie dog colonies within the wind park study area were completed during Summer 2011 (Figure 3.2-3) (Tidhar et al. 2011a). These surveys identified a total of 23 prairie dog towns totaling 764 acres within the wind park study area (less than one percent). The majority of prairie dog towns were located within Sub-Study Area A, much of which overlapped areas during 2007–2008 surveys. Many of the prairie dog towns were small and ranged in size from 0.07 acre to 251.3 acres. Fifteen towns were active while eight towns were inactive and appeared old and abandoned. Prairie dog colonies are important foraging grounds for several raptor species likely to occur, including golden eagle, red-tailed hawk, northern harrier, and ferruginous hawk. Prairie dog colonies also provide breeding and foraging habitat for burrowing owls. Colonies may serve to concentrate raptors in portions of the wind park study area throughout the year. During 2007–2008 avian use surveys, higher raptor use was observed at survey points located near active prairie dog towns relative to other portions of Sub-study Area A. Correspondence received May 4, 2010 from the AGFD included mapped prairie dog colonies present in Sub-study areas A and C, but otherwise few colonies are located within approximately 3 miles of the wind park study area.

Additionally, waterfowl and shorebirds using the few open water features present in the wind park evaluation area may also attract raptor species. These features include stock ponds and small ephemeral and perennial pools within canyon bottom streams and waterbodies. Other types of prey likely to be present are rodent and shrew species associated with semi-arid to arid grassland, shrub, and juniper woodland areas. Lagomorphs that may occur in the area include desert cottontail and black-tailed jackrabbit (*Lepus californicus*); however, these species are not expected to occur at greater density within the wind park study area relative to the surrounding landscape.



Legend

Proposed Wind Park Study Area

Grapevine Sub-study Area A

Observation Point

Raptor Use by Point

0.00 - 0.25

0.25 - 0.50

0.50 - 0.75

0.75 - 1.00

1.00 - 2.00

Prairie Dog Towns

Active

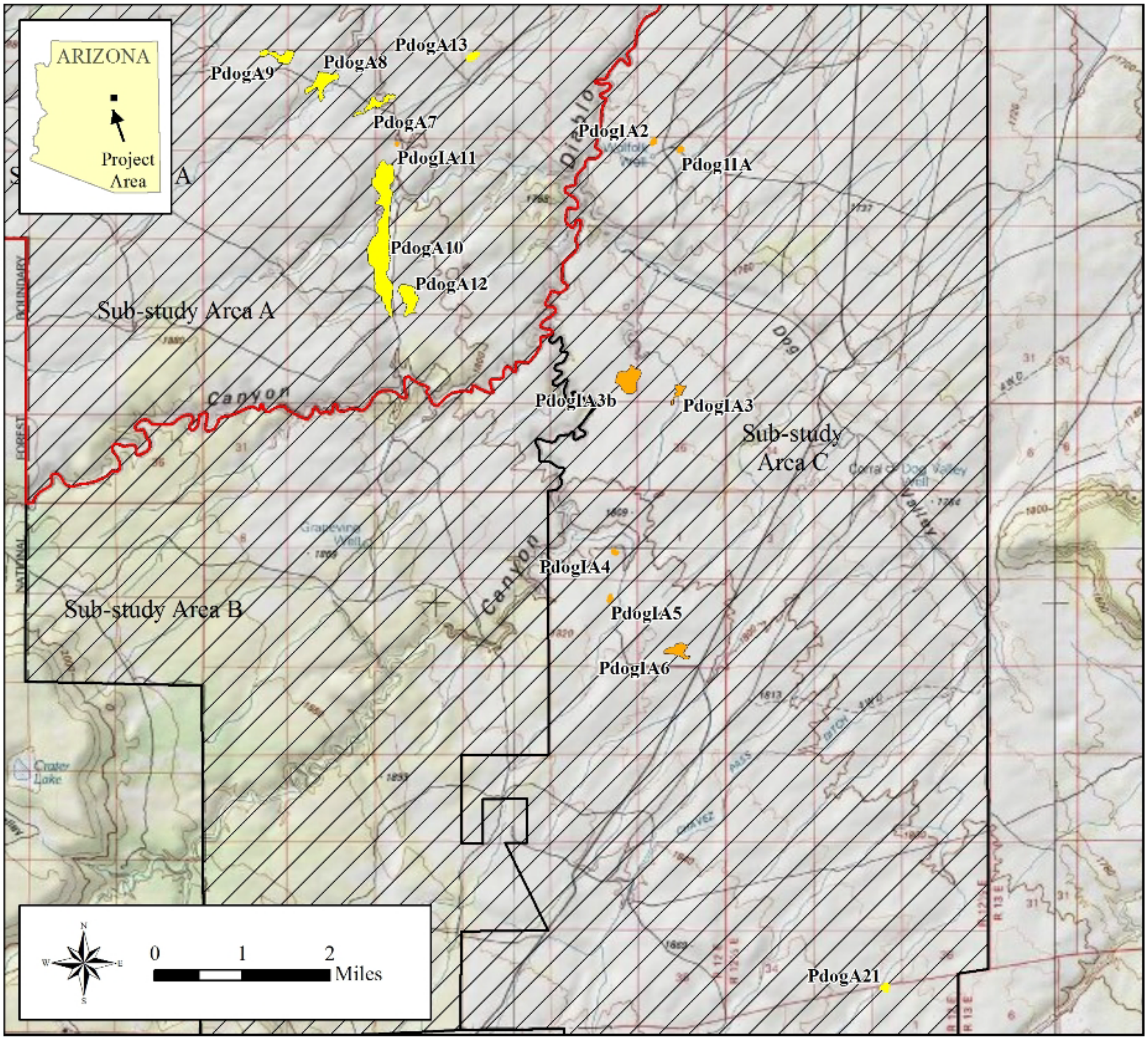
Inactive

Raptor Use in Relation to Prairie Dog Colonies - Sub-study Area A

Grapevine Canyon Wind Project

FIGURE 3.2-2

Number of observations per 20-minute observation.
Data plotted separately for eagle (bald, golden and unidentified) observations only, and all raptor species observations combined (golden eagle, bald eagle, Cooper's hawk, sharp-shinned hawk, red-tailed hawk, northern harrier, merlin, American kestrel, prairie falcon, western burrowing owl, unidentified buteo, unidentified eagle, unidentified falcon and unidentified raptor).
Source: Young et al 2009



Legend

Proposed Wind Park Study Area

Grapevine Canyon Wind Park Sub-study Area A

2011 Prairie Dog Towns

Active

Inactive

Prairie Dog Towns - Status

Grapevine Canyon Wind Project

Tidhar et al. 2011a

FIGURE 3.2-3

Other Migratory and Breeding Birds

Most species of birds are provided protection by the Migratory Bird Treaty Act (MBTA), which states that it is unlawful to take, kill, or possess any bird listed under its protection. Legal protection for migratory birds is further explained under EO 13186 (2001). The project biological resources evaluation area contains stopover habitat for songbirds, waterfowl, and shorebirds in the forms of grassland, shrubland, pinyon-juniper woodland, and a few wetland/riparian areas, and it is likely that migrating birds utilize these areas during migration.

Important Bird Areas – Songbirds (Order Passeriformes) are by far the most abundant bird group in most terrestrial ecosystems and are the most often reported fatalities at wind-energy facilities (NRC 2007; NWCC 2010). The Audubon Society lists Important Bird Areas (IBAs) that are sites providing essential habitat for one or more species of bird (National Audubon Society 2009). These include sites for breeding, wintering, and/or migrating birds and can range from a few, to thousands of, acres in size. The proposed wind park study area lies immediately to the east of a portion of the Anderson Mesa IBA located within the Forest. Anderson Mesa begins about nine miles southeast of Flagstaff and extends as a gently sloping tableland for approximately 25 miles to the southeast. The wind park study area lies along a portion of the northeastern edge of the Anderson Mesa while the proposed transmission tie-line extends east-west across a portion of the mesa.

Along the length of the Anderson Mesa is a complex of permanent, semi-permanent, and ephemeral lakes and wetlands, plus grasslands, pinyon-juniper woodland, and conifer forests. The largest of the lakes, Mormon Lake, lies approximately 10.0 and 3.5 miles to the west of the wind park evaluation area and western terminus of the proposed transmission tie-line, respectively. Some smaller features are located within 2 miles of the transmission tie-line, but the proposed and alternate transmission tie-line routes do not overlay any of these. The wetland complex within the Anderson Mesa IBA has been documented as one of two major waterfowl use areas in Arizona during migration, particularly by dabbling ducks during Spring migration (National Audubon Society 2009). A variety of land birds also use the IBA for breeding and as a migration stopover site. The extensive pinyon pine and juniper woodlands in the area support populations of pinyon jay (*Gymnorhinus cyanocephalus*), a species of global conservation concern because of the limited distribution of pinyon pine on which the species depends (National Audubon Society 2009).

<u>USFWS Birds of Conservation Concern</u> – The wind park study area lies near the southwestern boundary of the Southern Rockies/Colorado Plateau Bird Conservation Region. Twenty-seven species are listed by the USFWS as Birds of Conservation Concern within this region (USFWS 2008; Table 3.2-3). These species, like other species of migratory birds, are protected under the MBTA, but do not receive additional special protections unless they are also listed by the USFWS under the ESA, Eagle Protection Act, or by the AGFD, but have been identified as vulnerable to population declines in the area by the USFWS (2008). Of these, four species have been documented by Arizona's Natural Heritage Program as occurring within the Canyon Diablo and/or Middle Little Colorado Watersheds: bald eagle, ferruginous hawk, peregrine falcon, and burrowing owl (AGFD 2009).

During WEST's 2007/2008 baseline avian surveys at Sub-study Area A, seven USFWS species of conservation concern were observed: bald eagle, ferruginous hawk, prairie falcon, burrowing owl, gray vireo (*Vireo vicinior*), pinyon jay, and Cassin's finch (*Carpodacus cassinii*) (Young et al. 2009). USFWS correspondence (see Appendix A of Tidhar and Chatfield 2010a) identifies the gray vireo, loggerhead shrike (*Lanius ludovicianus*), and olive-sided flycatchers (*Contopus cooperi*) as species potentially affected by project development. A total of three detections of gray vireos, 32 of loggerhead shrikes, and zero of olive-sided flycatchers were recorded during Sub-study Area A surveys (Young et al. 2009). During avian surveys conducted at the proposed nearby Sunshine Wind Park, 13 detections of loggerhead shrikes and none of gray vireos or olive-sided flycatchers were recorded (WEST 2006). Potential occurrence of gray vireo and olive-sided flycatcher is greatest in open woodlands and associated areas primarily located west of the Grapevine wind park evaluation area atop Anderson Mesa. These data suggest that there is lower probability that these species would occur within the wind park study area compared with Anderson Mesa. Data from the nearby proposed Sunshine Wind Project studies indicate low breeding or probability of occurrence for these species in open grasslands associated with large portions of the wind park study area. Loggerhead shrike habitat is available within the wind park study area and within the wider region; the species is not listed as a USFWS bird of conservation concern in Southern Rockies/Colorado Plateau Bird Conservation Region (Table 3.2-3).

TABLE 3.2-3
BIRD SPECIES OF CONSERVATION CONCERN WITHIN THE SOUTHERN ROCKIES/COLORADO PLATEAU BIRD CONSERVATION REGION

Species	Scientific Name
Gunnison sage-grouse	*Centrocercus minimus*
American bittern	*Botaurus lentiginosus*
bald eagle (b)	*Haliaeetus leucocephalus*
ferruginous hawk	*Buteo regalis*
peregrine falcon (b)	*Falco peregrines*
prairie falcon	*Falco mexicanus*
snowy plover (c)	*Charadrius alexandrines*
mountain plover	*Charadrius montanus*
long-billed curlew	*Numenius americanus*
yellow-billed cuckoo (a)	*Coccyzus americanus*
flammulated owl	*Otus flammeolus*
burrowing owl	*Athene cunicularia*
Lewis's woodpecker	*Melanerpes lewis*
willow flycatcher (c)	*Empidonax traillii*
gray vireo	*Vireo vicinior*
pinyon jay	*Gymnorhinus cyanocephalus*
juniper titmouse	*Baeolophus ridgwayi*
Veery	*Catharus fuscescens*
Bendire's thrasher	*Toxostoma bendirei*
Grace's warbler	*Dendroica graciae*
brewer's sparrow	*Spizella breweri*
grasshopper sparrow	*Ammodramus savannarum*
chestnut-collared longspur	*Calcarius ornatus*
black rosy-finch	*Leucosticte atrata*
brown-capped rosy-finch	*Leucosticte australis*
Cassin's finch	*Carpodacus cassinii*

(a) ESA candidate; (b) ESA delisted; (c) non-listed subspecies or population of threatened or endangered species
Source : USFWS 2008

Arizona Partners in Flight Priority Species – Partners in Flight is an international program dedicated to conserving bird populations in North and South America. The program was initiated in 1990 as a cooperative effort among Federal, State, and local government agencies, professional organizations, conservation groups, academia, industry, and private individuals. The Arizona Working Group of Partners in Flight (APIF) has developed a Bird Conservation Plan (Latta et al. 1999) as part of the international Partners in Flight effort. The purpose of the plan is to identify avian species and habitats most in need of conservation and to establish objectives and conservation efforts for bird populations and habitats within Arizona. The plan addresses 280 breeding bird species within Arizona, including 43 priority species within 13 major habitat types. Of the major habitat types identified within the plan, three are present within the wind park study areas and/or transmission tie-line evaluation areas: ponderosa pine forest, pinyon-juniper forest, and high elevation grassland. Priority bird species identified for each of these habitat types, and their potential to occur in the wind park study area is addressed in Table 3.2-4. Additional information regarding these species and their potential for occurrence is found in Appendix D.1. Three species associated with pinyon-juniper habitats (pinyon jay, gray vireo [*Vireo vicinior*], and juniper titmouse [*Baeolophus ridgwayi*]) have high potential for occurrence. One-hundred and ninety seven pinyon jays were observed during avian use studies at Sub-study Area A, of which 65 percent (127) occurred during the Fall season and were likely migrants. Three gray vireos and eight juniper titmice were observed during year-round surveys. None of these species was observed at the nearby proposed Sunshine Wind Project (WEST 2006), and these results are indicative of the absence of suitable habitat. Based on habitat availability, the probability for these species to occur in Sub-study Area C is low compared with Sub-study Areas A and B. Four western burrowing owl detections were made during avian surveys completed at Sub-study Area A within or near Gunnison's prairie dog towns (Young et al. 2009). Prairie dog towns provide foraging and nesting habitat for the species. Summer 2011 surveys identified a total of 23 prairie dog towns totaling 764 acres within the wind park study area (less than one percent of the wind park study area) (Tidhar et al. 2011a). The majority of prairie dog towns were located within Sub-Study Area A. Many of the prairie dog towns were small and ranged in size from 0.07 acre to 251.3 acres (Figure 3.2-4).

TABLE 3.2-4
ARIZONA PARTNERS IN FLIGHT PRIORITY AVIAN SPECIES WITH POTENTIAL TO OCCUR ALONG THE TRANSMISSION TIE-LINE AND WITHIN THE WIND PARK STUDY AREA

Habitat Type	Species	Potential for Occurrence – Wind Park Study Area	Potential for Occurrence – Transmission Tie-Line
Ponderosa pine	northern goshawk *Accipiter gentilis*	Extremely Low	Extremely Low
	olive-sided flycatcher *Contopus cooperi*	Extremely Low	Low
	cordilleran flycatcher *Empidonax occidentalis*	Extremely Low	Extremely Low
	purple martin *Progne subis*	Extremely Low	Low
Pinyon-juniper	gray flycatcher *Empidonax wrightii*	Extremely Low	Extremely Low
	pinyon jay *Gymnorhinus cyanocephalus*	High	High
	gray vireo *Vireo vicinior*	High	High
	black-throated gray warbler *Dendroica nigrescens*	Moderate	Moderate
	juniper titmouse *Baeolophus ridgwayi*	High	High
High elevation grassland	ferruginous hawk *Buteo regalis*	Extremely Low	Extremely Low
	Swainson's hawk *Buteo swainsonii*	Extremely Low	Extremely Low
	burrowing owl *Athene cunicularia*	Low	Extremely Low
	grasshopper sparrow *Ammodramus savannarum*	None	None
Source: Latta et al. 1999			

Breeding Birds: The USGS Breeding Bird Survey (BBS) is a large-scale survey of North American breeding birds (Sauer et al. 2008). Each June over 3,500 designated routes in the continental U.S. and southern Canada are surveyed by experienced birders. Each BBS route is 24.5 miles long and consists of 50, three-minute point counts along the length of the route. Information gathered from these surveys allows some indication of species that may utilize the region either transiently or for breeding habitat during the Summer. The BBS routes closest to project components are the Happy Jack and Forest Lakes routes; however, these routes are located in the higher-elevation, forested region to the west and south of the wind park evaluation area and generally do not contain habitat types representative of the wind park study area. Alternatively, the Castle Buttes route located approximately 40 miles to the northeast is characterized by Great Basin shrub and grassland habitats more likely to support bird species found within the wind park evaluation area.

The Happy Jack route has been surveyed for 17 years between 1985 and 2007. A total of 65 species have been observed along this route, including six raptor species and one vulture species (bald eagle, sharp-shinned hawk, northern goshawk, red-tailed hawk, American kestrel, great-horned owl, and turkey vulture) (Sauer et al. 2008). The most common species observed along this route were pygmy nuthatch (*Sitta pygmaea*), American robin (*Turdus migratorius*), violet-green swallow (*Tachycineta thalassina*), dark-eyed junco (*Junco hyemalis*), Grace's warbler (*Dendroica graciae*), and plumbeous vireo (*Vireo plumbeus*), each with an average of less than10 individuals sighted per year. No Federally listed species have been observed along the route. Two state wildlife species of special concern and Forest Service sensitive species (bald eagle and northern goshawk) and two Federal birds of conservation concern (Grace's warbler, Cassin's finch) have been observed along the route (USFWS 2008; AGFD 2009b; Forest Service 2009). Raptors observed on the Happy Jack and Forest Lakes routes include bald eagle, northern goshawk, sharp-shinned hawk, peregrine falcon, and great horned owl. Of these, bald eagle, northern goshawk, and peregrine falcon are considered state species of special concern by the AGFD (2009a).

The Castle Buttes route have been monitored for seven years between 1992 and 2007. A total of 38 species have been observed along this route, including four raptor species and one vulture species (red-tailed hawk, golden eagle, American kestrel, prairie falcon, and turkey vulture) (Sauer et al. 2008). The most common species observed along this route were horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), western meadowlark (*Sturnella neglecta*), mourning dove (*Zenaida macroura*), Cassin's kingbird, and lark sparrow (*Chondestes grammacus*) with an average of greater than 10 individuals sighted per year. This is generally similar to the most common species observed during the avian use surveys conducted by WEST during the Summer of 2007 at Sub-study Area A of the wind park study area which included detections of lark sparrow, horned lark, and northern mockingbird (Young et al. 2009). No Federal threatened or endangered species or state species of special concern have been observed along the Castle Buttes route, but two Federal species of conservation concern have been observed: prairie falcon and pinyon jay (USFWS 2008). Four prairie falcons and 197 pinyon jay were observed during the avian use surveys conducted by WEST during the Summer of 2007 at Sub-study Area A of the wind park evaluation area (Young et al. 2009).

Avian Migration

Songbirds – The wind park study area lies within the Intermountain West region of the extensive American Pacific Flyway, one of five primary migratory routes for waterbirds, shorebirds, songbirds, and raptors. Many species of songbirds migrate at night and may collide with tall man-made structures during migration periods, particularly during weather conditions that force them to fly at lower altitudes and within the turbine rotor swept area (NWCC 2010; Manville 2009). It is generally assumed that nocturnal migrating passerines move in broad fronts rather than along specific topographical features (Gauthreaux et al. 2003; NRC 2007). Overall passerine use of Sub-study Area A (as determined by the number of observations per 20-minute avian use survey) was highest during Winter (Young et al. 2009).

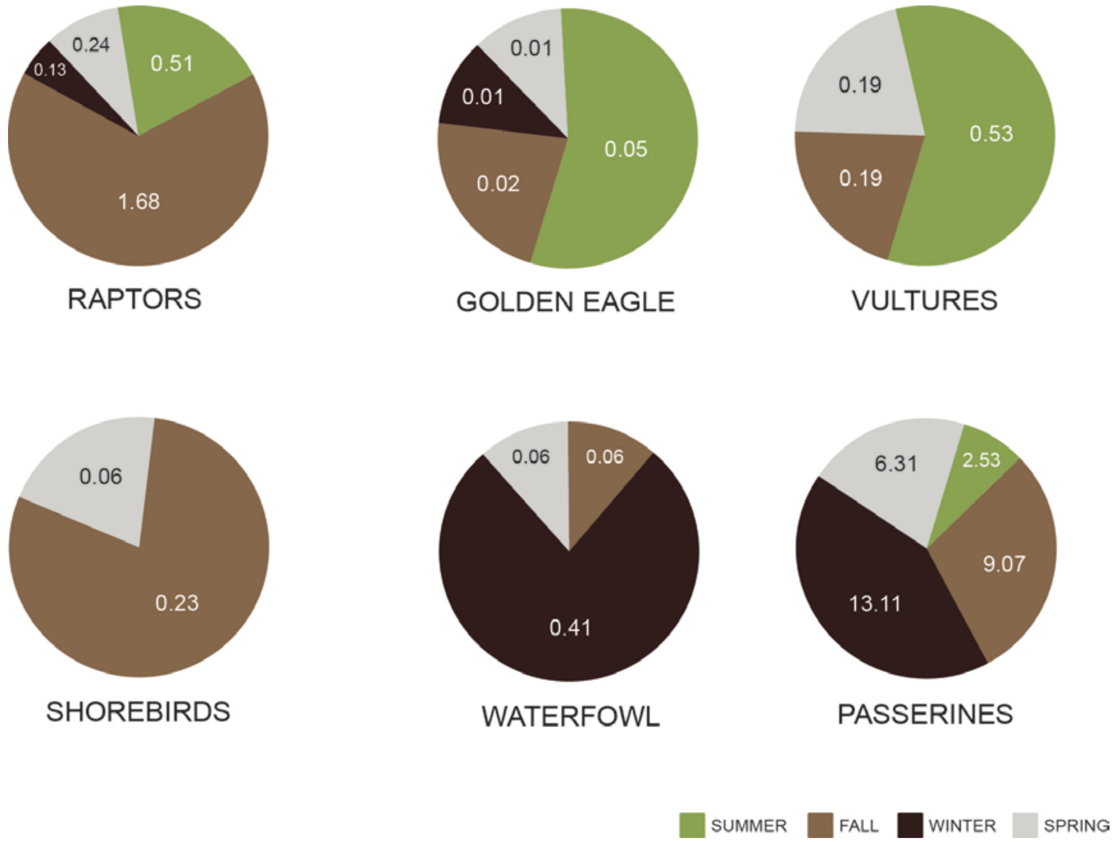
Waterfowl – During avian baseline surveys completed at Sub-study Area A in 2007 and 2008, use by resident and migrating waterfowl and shorebirds was found to be low, comprising less than 3 percent of overall bird use (Young et al. 2009). Observations for these bird groups was even lower during surveys conducted at the proposed nearby Sunshine Wind Project (WEST 2006), suggesting that waterfowl and shorebird use declines away from the Anderson Mesa. While the wind project study area itself has very little wetland habitat, the wetland complex along the Anderson Mesa west of the wind park study area and adjacent to the transmission tie-line has been documented as one of two major waterfowl use areas in Arizona during migration, particularly by dabbling ducks during Spring migration (National Audubon Society 2009; see section *Important Bird Areas*).

Raptors – Several factors influence the migratory pathways of raptors, the most significant of which is geography. Two geographical features primarily used by raptors during migration are ridgelines and the shorelines of large bodies of water. Updrafts formed as the wind hits the ridges and thermals created over land (and not water) make for energy-efficient travel over long distances. It is for this reason that raptors tend to follow corridors or pathways, for example along prominent ridges with defined edges or shorelines, during migration.

While it is certain that raptors migrate through the wind project study area, the majority of the site is characterized by a flat upland plain that would generally not be expected to concentrate or funnel raptors during migration. This plain may create thermal conditions which would be expected to provide flight conditions conducive to efficient migration of raptors at relatively high altitudes. The presence of several larger canyons in the area (particularly the Canyon Diablo and Grapevine Canyon through the central portions of the wind park study area, Yaeger and Anderson Canyons in the northwest corner of the wind park study area, and Jack's Canyon in the southeast [Figure 3.2-2]) may serve as important stopover areas for some raptor species during migration. The potential exists for migrating birds that utilize updrafts to concentrate along these canyon rims, such as raptors that utilize updrafts and thermals created by topography.

Additionally, the presence of Gunnison's prairie dog colonies (Tidhar et al. 2011a) and waterfowl/shorebirds concentrated at water sources could also attract resident and migrating raptors. The western-most portions of the transmission tie-line evaluation area, to the west of Sub-study Area A and B of the wind park study area, have greater topographic relief, as well as a greater number of seasonal ponds and lakes and therefore, may be more likely to attract migrating raptors. Avian use studies conducted at Sub-study Area A (Young et al. 2009) indicate Fall raptor use was relatively high (1.68 raptors per plot per 20-minute survey) compared with other seasons (Winter: 0.13; Spring: 0.24; Summer: 0.51 raptors per plot per 20-minute survey; Figure 3.2-4). Fall 2007 raptor use resulted primarily from increased observations of red-tailed hawks, but also included greater species diversity relative to other seasons (Young et al. 2009). Raptor observations also peaked during the Fall migration period at the nearby proposed Sunshine (WEST 2006); however, with less overall activity than observed at Sub-study Area A. These observations suggest the area is used by some migrating raptors.

FIGURE 3.2-4



Mean bird use (number per plot per 20-minute survey) by season for major bird types and golden eagle at the Grapevine Canyon Wind Park Sub-study Area A (Young et al. 2009).

Bat Species

Due to the current lack of understanding of bat populations in North America, the species and relative abundance of bats occurring within the biological resources evaluation area are difficult to determine. Based on range maps and species accounts from AGFD and Bat Conservation International (2009) 28 species of bat are known to occur in Arizona, with 20 species having an approximate range that includes the evaluation area or surrounding region. Of these 20 species, 13 have the potential to roost or forage within the transmission tie-line or wind park study area: Allen's lappet-browed bat, greater western mastiff bat, pallid bat (*Antrozous pallidus*), pale Townsend's big-eared bat, big brown bat (*Eptesicus fuscus*), spotted bat, California myotis (*Myotis californicus*), western small-footed myotis (*Myotis ciliolabrum*), Arizona myotis (*Myotis occultus*), fringed myotis (*Myotis thysanodes*), big free-tailed bat (*Nyctinomops macrotis*), canyon bat (*Parastrellus hesperus*), and Mexican free-tailed bat (*Tadarida brasiliensis*). An additional three species are likely seasonal migrants through the wind park study area: silver-haired bat (*Lasionycteris noctivagans*), western red bat (*Lasiurus blossevillii*), and hoary bat. Bat mist net and emergence count surveys were completed by WEST during the Fall 2011 migration season within the wind park study area (Tidhar et al. 2011b). Six species were identified during surveys: Arizona myotis, Yuma myotis, western small-footed myotis, pale Townsend's big eared bat, big brown bat, and pallid bat.

The most likely roosting habitat for bats within the biological resources evaluation area is within the Diablo and Grapevine canyons. Caves, crevices, and rock outcrops along the canyon walls likely provide habitat for roosting and hibernating bats. Abandoned structures located within the wind park study area also provide roosting habitat for bats. Juniper savannah/woodlands may also provide roosting habitat for tree-roosting species. Bats forage at the creeks, springs, ponds, and stock tanks throughout the evaluation area, and these areas are likely to concentrate both resident and migrant species. Fall 2011 bat surveys targeted water features, canyon bottoms, and abandoned structures. Among mist net sites, capture rates were highest at stock tanks and lowest within the canyon bottom. Among abandoned structures surveyed, only one abandoned house contained roosting bats—an abandoned house located outside of proposed development areas.

Big Game

The wind park, transmission tie-line, and switchyard evaluation areas provide habitat for several species of big game including elk, mule deer, and pronghorn antelope. All three species were observed during 2007–2008 surveys at Sub-study Area A.

<u>Elk</u> – Elk populations within Arizona are considered to be demonstrably widespread, abundant, and secure state-wide (AGFD 2009e) with the elk herds occurring in the Forest and surrounding State and private lands considered the core of Arizona's elk population (AGFD 2007a). The elk in this region typically summer in mountain meadows and montane coniferous forests and winter in lower-elevation pinyon-juniper woodlands and grasslands (Forest Service 2002; AGFD 2007a). The elk herd occurring in the 5BN Game Management Unit (AGFD 2008), in which the transmission tie-line and switchyard are located, is considered stable (AGFD 2007a). Ponderosa pine, pinyon-juniper woodland, and grassland habitats used by elk are present within the wind park study, transmission tie-line, and switchyard areas. The species is likely to occur during the Winter and possibly throughout the year.

<u>Mule Deer</u> – Mule deer typically summer at high elevation aspen and ponderosa pine forests and winter in lower elevation pinyon-juniper woodlands (Forest Service 2002). While mule deer populations within Arizona are considered to be demonstrably widespread, abundant, and secure state-wide (AGFD 2009e), from 1985 to 2001 a declining trend in mule deer populations has been observed on the Forest (Forest Service 2002). This may be due to a number of factors including disease, poaching, climatic conditions (drought), and habitat changes. Populations in the past few years appear to have stabilized, possibly in response to increased precipitation in recent years (AGFD 2008). Habitats used by mule deer (e.g., pinyon-juniper woodlands, ponderosa pine forests) are present in the vicinity of the transmission tie-line and switchyard, and the species is likely to occur in these areas.

<u>Pronghorn</u> – Most pronghorn occur between 3,000 and 7,000 feet elevation and inhabit a variety of habitat types from desert grassland to forest and mountain meadows; however, they generally prefer flat, open grassland areas (AGFD 2007b). The transmission tie-line, switchyard, and the wind park study area fall within the range of the Anderson Mesa herd of pronghorn antelope. This population declined throughout recent decades as a result of habitat degradation and drought (AGFD 2007b; Forest Service 2002). The pronghorn in this area are functionally split into two groups; one group spends the Winter at lower elevation grasslands and spends the rest of the year on Anderson Mesa, and the second group lives year-round in the lower elevation habitat. The majority of the herd winters in grasslands and shrublands. Migration movement through the wind park study area is moderate (Appendix D.1). This herd has been the focus of research and habitat improvement treatments managed by AGFD (Tidhar and Chatfield 2010a) which have occurred within and outside the biological evaluation area. The overall trend for grasslands within the Forest is stable to declining due to tree encroachment, fire suppression, long-term climatic trends, short-term drought, and wildlife grazing (Forest Service 2002).

3.2.2 Environmental Consequences

This section evaluates the project's impacts on biological resources. Primary concerns are impacts to Federally- and State-listed species, Forest Service MIS and sensitive species, birds, bats, and big game. Definitions of impacts are as follows:

- Short-term impacts are those that last through the construction phase of a project, or one or two reproductive cycles, whichever is longer.
- Long-term impacts are those that last more than two reproductive periods, or as long as the life of the proposed project facilities, depending on the organism or habitat involved.
- Direct impacts are those that occur as a result of construction or operation of the wind park, transmission tie-line, switchyard and all other associated infrastructure including avian or bat collisions with wind turbines or transmission tie-line conductors and overhead groundwires.
- Indirect impacts are those that may occur as a result from new access roads providing increased human accessibility to a previously inaccessible area, or habitat alteration or loss resulting in displacement.

3.2.2.1 Standards of Significance

The proposed project components and alternatives would have a significant and adverse effect on biological resources if they would:

- Adversely affect a listed endangered, threatened, or proposed plant or animal species or designated critical habitat.
- Cause direct impacts to populations which trends toward Federal listing or loss of viability for Forest Service sensitive species
- Result in a long-term loss of vegetation or habitat which leads to the decline of populations and would threaten the continued existence of a plant or animal species.
- Affect the biological viability of a local, regional, or national population of a listed wildlife species or one of concern/interest leading to a downgrading in its listing.
- Violate the ESA, the Bald and Golden Eagle Protection Act, or the MBTA, which all protect Federal- and State-listed species.
- Substantially interfere with the movement of any native resident or migratory fish or wildlife species for more than two reproductive seasons.
- Reduce the value of habitat for fish, wildlife, or plants to an unusable level.
- Cause a native fish or wildlife population to drop below self-sustaining levels.
- Adversely and substantially affect important riparian areas, wetlands, or other wildlife habitats.

3.2.2.2 Foresight's Proposed Project and Proposed Federal Actions

Based on the information presented in the Wildlife and Botanical Report, Site Characterization Report, and Avian and Bat Studies Report it is determined that construction and operation of the proposed wind park, transmission tie-line, and switchyard would result in impacts to biological resources, as described below.

Impacts to Special Status Species

Impacts to Special Status Plant Species

Impacts to special status plant species are broken into two sections: impacts related to the wind park itself, and impacts related to the transmission tie-line and switchyard components of the project.

Impacts to Special Status Plant Species (Wind Park)

The majority of special status plant species have highly restricted distributions and very specific habitat requirements and are not expected to occur within the wind park study area based on either an absence of habitat, range, or distribution. Few records for any of the species evaluated exist for either the biological resources evaluation area or the surrounding two miles evaluated in the Site Characterization Report (see Appendix D). Canyon bottoms containing riparian areas, deciduous woodlands, wetlands, or waterbodies may support wetland and mesic plant species not found within the vast majority of the wind park. Canyon bottoms are not anticipated to be impacted by project facilities or infrastructure; if project-related activities are anticipated in these areas, ground disturbing activities in these areas would be preceded by appropriate plant surveys to ensure sensitive plant species are not present prior to construction. Populations of the species located during pre-construction surveys would be avoided or translocated, if possible, to avoid direct impacts. Indirect impacts to the species would be mitigated, if necessary, following RPMs identified in Table 2.7-1.

No State sensitive plant species are expected to occur in the wind park study area. Of Federal- and State-listed plant species, only the Peebles Navajo cactus (*Pediocaactus peeblesianus* var. *peeblesianus*) was ranked as having moderate potential to occur within the wind park based on availability of habitat and known distribution within the vicinity of the biological resources evaluation area. Field surveys for this species have not occurred. Pre-construction surveys within construction zones, as described in Table 2.7-1, would result in avoidance of direct impacts to the species. Populations of the species located during pre-construction surveys would be avoided or translocated, if possible, to avoid direct impacts. Indirect impacts to the species may be mitigated through habitat restoration, if necessary, following RPMs identified in Table 2.7-1. With application of these measures, adverse direct and indirect impacts would be minimized and applicable biological resources significance standards would not be exceeded.

Impacts to Special Status Plant Species (Transmission Tie-line and Switchyard)

Bebb's willow and Flagstaff beardtongue may occur within the transmission tie-line and switchyard portion of the project, although the lack of water or wetlands and non-suitable soil types would result in an extremely low potential for occurrence, and no impacts to these species are expected. The proposed transmission tie-line and switchyard would not likely effect Bebb's willow because suitable habitat is not present. No riparian habitats are found within or immediately adjacent to the transmission tie-line. The probability of occurrence of Flagstaff beardtongue is considered extremely low due to the absence of limestone-derived soil. The proposed transmission tie-line may have short-term, direct impacts on Flagstaff beardtongue resulting in the loss of individuals during construction, if suitable habitat is available. Soils along the transmission tie-line alignment and within the switchyard area are generally derived from basalt, which are not characterized as suitable for the species; however, locations in the Forest include sites with similar forest characteristics to those found along portions of the transmission tie-line, which include mixed oak and pinyon-juniper woodlands. The transmission tie-line evaluation area does not have evidence of limestone or sandstone outcrops, instead the mesa is built upon a basalt soil foundation. Pre-construction surveys of suitable habitat along the transmission tie-line to identify the species may be warranted as determined by agency consultation. Populations of the species located during pre-construction surveys would be avoided or translocated, if possible, to avoid direct impacts. Indirect impacts to the species would be mitigated, if necessary and possible, following RPMs identified in Table 2.7-1. The switchyard does not contain suitable habitat for this species, and there would be no effect of the switchyard on the species. Therefore, no impacts to special status plant species are expected as a result of construction and operation of the wind park facilities, and impacts which may occur would not be expected to result in impacts to populations.

Impacts to Invasive and Non-native Plant Species (Wind Park and Transmission Tie-line and Switchyard)

Construction of all project elements, including the access roads, wind turbines, wind park infrastructure, transmission tie-line, and switchyard could introduce noxious species to the project area if construction vehicles track contaminated soil from a contaminated area, or if contaminated soil is used in fill areas. Foresight would prepare a Weed Control Plan for the wind park and proposed transmission tie-line that is designed to minimize the spread of non-native and invasive species. The Weed Control Plan would address monitoring and educating personnel on weed identification, and methods for treating infestations. Foresight would ensure that all earth moving equipment brought onto the project area would be cleaned prior to entering the Forest. A high pressure hose should be used to clear the undercarriage, tire treads, grill, radiator, and any other areas where mud and dirt may accumulate. In addition, Western would require its construction contractor to employ similar measures to control noxious species.

Following construction, site restoration activities would begin immediately to further minimize the spread of noxious weeds. Temporary construction areas around project facilities would be restored according to the construction plan and any applicable State or Federal permits. In general, restoration activities would include the removal of excess rock/gravel, re-establishing pre-construction contours, spreading of stockpiled topsoil, and re-vegetation by seeding and mulching.

Best Management Practices identified as *Integrated Weed Management Practices in the Coconino, Kaibab, and Prescott National Forests Noxious and Invasive Weed Strategic Plan 1998, Amended 2002* (Appendix C.2) would be implemented for the construction of the proposed transmission tie-line. For the construction of the proposed switchyard, Western would comply with its approved noxious weed management plan for the Forest. Thus, the spread of invasive and non-native species would be minimized on Forest Service-managed lands and significance thresholds listed in Section 3.2.2.1 would not be exceeded.

Impacts to Special Status Wildlife Species

Impacts to special status wildlife species are described in several sections below—impacts to threatened or endangered wildlife species within or adjacent to the wind park, impacts to bald and golden eagles within or adjacent to the wind park, impacts to other sensitive wildlife species within or adjacent to the wind park, impacts to threatened or endangered wildlife species associated with the proposed transmission tie-line and switchyard, impacts to bald and golden eagles from the proposed transmission tie-line and switchyard, and impacts to Forest Service MIS Species associated with the proposed transmission tie-line and switchyard.

Impacts to Federal Threatened or Endangered Wildlife Species (Wind Park)

The California condor, southwestern willow flycatcher, and the yellow-billed cuckoo all have an extremely low potential to occur within or adjacent to the wind park study area, but may disperse or move through portions of the area. Spotted owls may use the coniferous forest areas along the Anderson Mesa intersected by the proposed transmission tie-line during foraging or dispersal, however suitable habitat also occurs in the surrounding area. Loss of coniferous forest due to construction of the transmission tie-line would occur within small and dispersed patches. These patches are fragmented within the landscape and do not contain high prey density. These patches are not undisturbed by human activities relative to the surrounding landscape.

It is unlikely that spotted owls would hunt within or disperse through the wind park Study Area due to the absence of suitable habitat. At the request of Western, WEST conducted a review of publically available data from post-construction wind-energy monitoring studies to search for records of Mexican spotted owl fatalities resulting from operation of WTGs. A total of 95 post-construction studies were reviewed by WEST to check for records of Mexican spotted owl collisions and zero fatalities were reported during these studies. It is important to note that not all studies were located within Mexican spotted owl range; however, the review was intended to be comprehensive for all current publically available fatality data. To minimize and mitigate risk of potential avian collisions and electrocutions along the proposed transmission tie-line and any other wind park overhead transmission or distribution lines, APLIC's Suggested Practices for Avian Protection on Power Lines (APLIC 1994, 2006) would be followed.

Impacts to Bald and Golden Eagles (Wind Park)

Bald Eagles

No habitat for the species would be directly affected by the wind park; therefore, no indirect impacts are anticipated. Nest surveys completed by Foresight during Spring 2011 within 10-miles of the wind park (Tidhar et al. 2011a) and information obtained from the AGFD (May 2011) conclude that no nest sites are located within this survey area. However, individuals may pass through the area as transients or during movement between foraging areas and may use transmission tie-line structures for perching. Most over-flights are predicted to occur during the Winter and Fall migration season based on existing information from surveys completed within the area (Young et al. 2009 and WEST 2006). To date, only two bald eagle fatalities have been reported at existing wind energy facilities in North America (Pearce 2010; Sharp et al. 2010). The greatest risk to the species from construction and operation of the wind park is likely direct impacts resulting from collision with overhead transmission lines. As a result, there remains a low risk of collision with or electrocution from any above ground transmission lines which may result in direct impacts to individuals. To minimize and mitigate risk of potential avian collisions and electrocutions along the proposed transmission tie-line and any other wind park overhead transmission or distribution lines, APLIC's Suggested Practices for Avian Protection on Power Lines (APLIC 1994, 2006) would be followed. An Avian and Bat Protection Plan (ABPP) would be implemented at the wind park in addition to post-construction monitoring. A post-construction monitoring study would be implemented to monitor the overall level of fatalities resulting from operation of the proposed wind park. In addition to the RPMs in the Draft and Final EIS, the ABPP will include a toolbox of operational practices and/or compensatory measures; individual practices would be implemented as needed if post-construction monitoring demonstrates that impacts are greater than anticipated. Data collected during final design and post-construction from the initial phase would be used to help inform design and operations of later phases. With implementation of these RPMs (which include the ABPP) during construction and operation, impacts to the bald eagle would be minimized and the significance thresholds in Section 3.2.2.1 would not be exceeded. The specific RPMs are listed in Section 2.7, Table 2.7.1.

Golden Eagles

Golden eagle breeding habitat is found along canyon edges within and adjacent to the wind park study area. During nest surveys completed in 2011, however, one occupied golden eagle nest site was documented within 10-miles of the wind park study area and all proposed project components, and this nest was not located within Diablo or Grapevine canyons. Unoccupied golden eagle nest sites were documented within the wind park study area during raptor nest surveys completed during 2008 and 2011, as referenced above. The potential exists for indirect effects to the species resulting from construction and operation of the wind park. Consequently, to minimize and mitigate risk of indirect impacts to golden eagles, RPMs included in the Draft EIS have been expanded and refined in the Final EIS. These RPMs would be implemented for facility planning, construction activities, resource monitoring, and development of an ABPP, which will include an Adaptive Management Plan with post-construction monitoring that will inform operations and micro-siting of all subsequent phases.

Studies indicate that raptor mortality at wind-energy facilities (for example, Altamont Pass Wind Resource Area [APWRA], California) may be in part due to behavioral differences between species, increasing the susceptibility of some for collision with turbines. Orloff and Flannery (1992, 1996) suggested that high golden eagle mortality at APWRA was in part due to the apparently high densities of ground squirrels (*Spermophilus beecheyi*) in the area (Thelander and Smallwood 2007). Continued research at the site revealed that the degree of aggregation of pocket gopher (*Thomomy bottae*) burrows around the turbines was positively correlated to red-tailed hawk fatality rates (Smallwood et al. 2001; Thelander et al. 2003; Thelander and Smallwood 2007). In addition, features providing cover for cottontails (*Sylvilagus auduboni*) appeared to be associated with areas where golden eagles were killed. Site-specific surveys to document prey availability were completed within the wind park Sub-study Area A during 2008 and within sub-study areas A, B, and C in 2011 (Tidhar et al. 2011a). Less than one percent of the wind park study area contains colonial prey. The low level of golden eagle use observed during 2007–2008 avian use surveys was not strongly correlated with avian use points situated near or within prey concentration areas. Nonetheless, to minimize risk of golden eagle collision in areas containing concentrated prey availability, wind turbine generators and infrastructure would not be located in prairie dog towns identified during site-specific surveys completed prior to construction for the initial or build-out phases. Pre-construction sensitive species surveys will ensure that site conditions and resources are documented and reflected in final micro-siting of the facilities prior to land disturbance.

Several comments on the Draft EIS referenced various recommendations for seasonal, and specific types of, surveys and two years of biological inventories or pre-construction surveys. Following the 2007–2008 baseline study (Young et al. 2009), additional surveys were implemented at the wind park study area (including Tidhar et al. 2011a, 2011b). A total of two years of pre-construction surveys will be completed within the initial build out phase prior to construction. Study findings are being discussed with USFWS and AGFD and will be included in development of the ABPP. The initial phase includes wind generation turbines, transmission tie-line, interconnection switchyard, step-up substations, operations and maintenance facility, primary site access road, service roads and collector lines. Subsequent phases would construct additional wind turbines, service roads, and collector lines. For the subsequent phases, the surveys completed to date provide adequate information for the Western and Forest Service decisions relative to the switchyard interconnection and the right-of-way use permit. Additional pre-construction surveys will be conducted on the build-out phase areas so that a total of two years of pre-construction surveys will be completed prior to construction of subsequent phases. The results of those additional surveys will inform a refined preliminary layout plan for those phases of the wind park and will be incorporated into the ABPP in consultation with USFWS and AGFD.

Low numbers of golden eagles have been documented during site-specific surveys year-round at the wind park. Direct impacts resulting from construction or operation of the wind park would be below the EIS significance standards and would not result in affects to the biological viability of the local, regional, or national population leading to a downgrading in its listing. However, there is a risk of the loss of individuals resulting from collisions with wind turbine generators. As a consequence, Foresight is working with the USFWS to develop, as part of the ABPP, a list of operational practices and compensatory mitigation options to provide a template for operational refinements and/or compensation in the event that fatalities result in increases in the level of impact identified in the EIS Post-construction biological resource monitoring would provide scientifically credible data from which refinements to operational practices may be developed through the Adaptive Management Plan. Post-construction mortality monitoring would be conducted to monitor bird fatality rates resulting from operation of the wind park and determine if any changes to the operational practices should be considered. Data collected during final design and post-construction from the initial phase would be used to help inform design and operations of later phases. With implementation of the RPMs (see Table 2.7-1) during construction and operation, impacts to the golden eagle would be minimized and significance thresholds would not be exceeded.

Impacts to Federal Threatened or Endangered Wildlife Species (Transmission Tie-Line and Switchyard)

Mexican Spotted Owl

The transmission tie-line contains low quality potential foraging habitat and is located within the species range. There is low risk of collision with overhead electrical transmission lines during flight. Implementation of RPMs, as well as in the ABPP being developed for the project, would minimize and mitigate the likelihood of bird collisions with the transmission tie-line. Minimization measures designed to reduce the risk of Mexican spotted owl collision with overhead electrical transmission lines include implementation of the APLIC standards (1994 and 2006).

Western believes that the proposed transmission tie-line, switchyard, and any overhead collection lines may affect, but is not likely to adversely affect, the interior populations of the Mexican spotted owl. Negative affects to the Mexican spotted owl are not anticipated to result from construction or operation of the wind park. No habitat for the species would be directly affected by the proposed Federal actions. Mexican spotted owls are not known to nest in, or immediately adjacent to, the transmission tie-line or switchyard and there have been no observations of the species in these areas or the immediately surrounding region based on publically available information from the AGFD, USFWS, and Forest Service (Appendix A) (Tidhar et al. 2010a). Coniferous forest components of the transmission tie-line or switchyard have extremely low or no potential to support nesting Mexican spotted owls due to: a) existing disturbance or land use conditions such as existing transmission lines or roads which decrease the probability for nest sites to be located within these areas, and b) sparse and low density of mature ponderosa pine stands within these areas. Spotted owls may use the coniferous forest areas along the Anderson Mesa intersected by the proposed transmission tie-line during foraging or dispersal, however suitable habitat also occurs in the surrounding area. Loss of coniferous forest due to construction of the transmission tie-line would occur within small and dispersed patches. These patches are fragmented within the landscape and do not contain high prey density. These patches are not undisturbed by human activities relative to the surrounding landscape. Individual spotted owls may pass through the transmission tie-line for foraging or between foraging areas. These individuals may be at risk for collision with the proposed transmission tie-line. To minimize and mitigate risk of potential avian collisions and electrocutions along the proposed transmission tie-line and any other wind park overhead transmission or distribution lines, APLIC's Suggested Practices for Avian Protection on Power Lines (APLIC 1994, 2006) would be followed. There are no records for transmission tie-line collision fatalities for the species within the Forest. Therefore, impacts to the species from existing transmission lines have not been observed, and the likelihood that the proposed action would increase collision risk to the species is unlikely, particularly as the transmission tie-line does not occur in breeding habitat or within an area known to concentrate the species.

Impacts to Bald and Golden Eagles (Transmission Tie-Line and Switchyard)

No habitat for the two species would be directly affected by the proposed transmission tie-line or switchyard as there is limited breeding habitat for either species in these areas and the immediate surrounding area; therefore, no indirect impacts are anticipated. Nest surveys completed by Foresight during Spring 2011 within 10 miles of the transmission tie-line and switchyard (Tidhar et al. 2011a) and information provided by the AGFD (May 2011) conclude that no nest sites are located within the vicinity of the transmission tie-line and switchyard. However, individuals may pass through the area as transients or during movement between foraging areas and may use transmission tie-line structures for perching. Most overflights of the transmission tie-line and switchyard are predicted to occur during the Winter and Fall migration season based on existing information from surveys completed within the area (Young et al. 2009; WEST 2006). There is low risk of electrocution of bald or golden eagles associated with the 345-kV rated transmission tie-line and switchyard due to the large spacing of energized components, which exceeds recommended spacing (APLIC 2006). There remains a low risk of collision with the transmission tie-line which may result in direct impacts to individuals (APLIC 1994). To minimize risk of potential avian collisions and electrocutions along the proposed transmission tie-line and any other wind park overhead transmission or distribution lines, APLIC's Suggested Practices for Avian Protection on Power Lines (APLIC 1994, 2006) would be followed. With implementation of APLIC practices impacts to bald and golden eagles would be minimized and the significance thresholds in Section 3.2.2.1 would not be exceeded and impacts would not affect the biological viability of the population.

Impacts to Other Sensitive Wildlife Species (Transmission Tie-Line and Switchyard

American Peregrine Falcon

Construction and operation of the transmission tie-line and switchyard may result in direct impacts through collision with power lines and/or electrocution. The risk of collision is considered extremely low because the transmission tie-line would not be located in breeding or foraging habitat and the species occurs at extremely low density in the region, primarily during migration seasons. Construction and operation of the proposed transmission tie-line and switchyard may result in direct impacts to the American peregrine falcon, but is not likely to result in a downward trend toward Federal listing. Peregrine falcons are known to hunt waterfowl concentrated at seasonal wetlands occurring throughout Anderson Mesa. Several of these wetlands are located within the transmission tie-line evaluation area; however, no wetlands exist immediately adjacent to the transmission tie-line, and no potential peregrine falcon foraging habitat would be impacted by the proposed transmission tie-line and switchyard, therefore, no indirect impacts are anticipated. There remains, however, a very low risk for peregrine falcons flying between foraging areas or during migration to collide with the proposed transmission tie-line which could result in the fatality of individuals. Following guidance of the APLIC Suggested Practices for Avian Protection on Power Lines (2006) would minimize and mitigate risk of potential avian collisions and electrocutions along the proposed transmission line and any other overhead transmission lines associated with the wind park. An ABPP would be implemented in addition to post-construction monitoring. Biological resource monitoring would provide scientifically credible data from which refinements to the Adaptive Management Plan[3] may be developed. As a result of these RPMs (refer to Table 2.7-1), impacts would be minimized and significance standards would not be exceeded.

Allen's Lappet-Browed Bat

The Allen's lappet-browed bat has a high potential to occur within or adjacent to the proposed transmission tie-line alignment. However, caves and mines used by the species for roosting are not presently adjacent to the transmission tie-line and switchyard, therefore, no breeding habitat or important hibernation areas would be affected. While the species is not listed by the AGFD as occurring within five miles of the proposed wind park, the bat has been documented within the Canyon Diablo Watershed, in which the transmission tie-line occurs, and is capable of ranging over long distances during foraging or migration. Suitable woodland habitat is present within the biological resources evaluation area, and a few loose-bark mature ponderosa pine snags are present in the area. There is extremely low potential for the species to roost within these snags during the maternity season, and low potential for the species to occur during the migration or maternity seasons. There is low risk that construction of the transmission tie-line or switchyard could result in the loss of individuals roosting within suitable snags during the maternity

[3]An Adaptive Management Plan would be implemented at the project whereby iterative decision-making (evaluating results and adjusting actions on the basis of what has been learned) would be undertaken to reduce impacts to biological resources. Adaptive Management may also be refined based upon observed impacts which have been documented as occurring at the project. Data collected during monitoring studies or facility operation would be used to refine the Adaptive Management Plan. Adaptive Management may involve consultation with experts, consultants, agency personnel, landowners, and other stakeholders or may also be developed internally by Foresight and implemented proactively.

season. Avoidance of these snags and/or avoidance of construction clearing during the maternity season are measures included in the RPMs (see Table 2.7-1) and, therefore, no direct effects to the species are anticipated, and significance standards listed in Section 3.2.2.1 would not be met.

Greater Western Mastiff Bat

High quality roost habitat for the species, generally characterized as rock crevices with vertical drop of 10 feet or more (AGFD 2009), is not believed to occur within the transmission tie-line right or way and is absent from the switchyard. Therefore, direct impacts to habitat are not anticipated for the greater western mastiff bat. The species may forage in the vicinity but is not anticipated to be affected by construction or operation of the transmission tie-line or switchyard.

Merriam's Shrew

The proposed transmission tie-line and switchyard would result in a loss of habitat for the Merriam's shrew. There is very limited amount of dry forest habitat suitable for the species within or adjacent to the transmission tie-line alignment or switchyard. The transmission tie-line and switchyard would remove less than 10 acres of dry coniferous forest habitat potentially used by the species, but this small amount of lost habitat would not result in loss of species viability. The construction and operation of project facilities is not likely to result in direct impacts which would lead toward a downward trend toward Federal listing. Construction operations may result in the destruction of individual burrows or loss of individuals, however, construction operations would be short-lived and operation of the transmission tie-line would have no long-term effect on the species.

Pale Townsend's Big-Eared Bat

Construction and operation of the proposed transmission tie-line and switchyard would have no direct effects to the pale Townsend's big-eared bat. Suitable habitat for the species in the form of caves and mines for roosting and large ponds for drinking are not present adjacent to the transmission tie-line alignment or the switchyard. The species may pass through the transmission tie-line in transit between wetland foraging areas and roost sites in the surrounding region, but habitat for pale Townsend's big-eared bat would not be impacted by the proposed transmission tie-line or switchyard. Impacts to this species would be minimal and applicable significance thresholds would not be exceeded.

Impacts to Forest Service MIS Species

Forest Service MIS that may be impacted by the proposed transmission tie-line and switchyard include the juniper titmouse, elk, mule deer, and pronghorn antelope. Discussion of expected impacts to elk, mule deer, and pronghorn antelope are described in the Big Game section and in detail in Appendix D.2.

The proposed transmission tie-line may have indirect impacts on juniper titmouse, although impacts would be small and would not be expected to affect overall habitat on Forest Service managed lands or population trends for the species. While the proposed transmission tie-line would remove some pinyon-juniper woodland (up to approximately 233 acres), this incremental loss is minor to the overall amount of pinyon-juniper woodland on the Coconino National Forest (estimated at more than 630,000 acres). This habitat type is abundant in the region and not a unique habitat feature. Construction, depending on timing, may result in the loss of individual juniper tit mouse nests or the mortality of individuals. Avoidance of direct impacts would be accomplished through restricting clearing operations conducted as part of construction during the breeding season. Resulting direct and indirect impacts would not result in impacts to Forest-wide population and habitat trends and would not exceed significance thresholds defined in Section 3.2.2.1.

Impacts to Breeding and Migratory Birds(Wind Park)

The most probable impact to birds from wind projects is direct mortality or injury due to collisions with turbines (NWCC 2010; Strickland et al 2011). Collisions may occur with resident birds foraging and flying within the project area or with migrant birds seasonally moving through the area. Substantial data on bird mortality at wind-energy facilities are available from studies in California and throughout the west and Midwest. However, there is currently a lack of data on bird mortality from comparable wind projects operating in Arizona, northern New Mexico, Utah, central and southern Nevada, or southern Colorado—areas which contain similar habitats and biological communities to the wind park study area. Only one commercial wind-energy project has been constructed in Arizona, and data from wildlife monitoring studies conducted to estimate fatality rates at the project (Dry Lake I Wind Project) were recently made public (Thompson et al. 2011). No raptor fatalities were found at the Dry Lake I Wind Project during 2010. Other monitoring studies closest to the wind park study area are located in California. Of 841 bird fatalities reported from California studies (greater than 70 percent from APWRA in California), 39 percent were diurnal raptors, 19 percent were passerines (excluding house sparrows [*Passer domesticus*] and European starlings [*Sturnus vulgaris*]), and 12 percent were owls. Non-protected birds, including house sparrows, European starlings, and rock doves (*Columba livia*), comprised 15 percent of the fatalities. Other bird types generally made up less than 10 percent of the fatalities (Erickson et al. 2002). During 12 fatality monitoring studies conducted outside of California, diurnal raptor fatalities comprised 2 percent of the fatalities and raptor mortality averaged 0.03 per turbine per year. Passerines (excluding house sparrows and European starlings) were the most common collision victims, comprising 82 percent of the 225 fatalities documented. For all bird species combined, estimates of the number of bird fatalities per turbine per year from individual studies ranged from zero at the Searsburg, Vermont (Kerlinger 1997) and Algona, Iowa facilities (Demastes and Trainer 2000) to 7.7 at the Buffalo Mountain, Tennessee facility (Nicholson 2003). Using mortality data from the last 12 years from wind projects throughout the entire United States, the average number of bird collision fatalities is less than four birds per MW per year (NWCC 2010).

Exposure indices of non-raptors indicate that unidentified swallow, raven, and pinyon jay are most likely to be exposed to potential collision with wind turbines at Sub-study Area A. Despite relatively high use and exposure, common ravens are rarely reported as fatalities according to monitoring studies at other wind-energy facilities (Erickson et al. 2001; 2002). At the Tehachapi Pass wind-energy facility in California, common ravens were found to be the most common large bird in the wind resource area, yet no fatalities for this species were documented during intensive studies (Anderson et al. 1996). Most non-raptors had relatively low exposure indices due to the majority of individuals flying below the zone of risk.

Predicting numbers of fatalities at wind energy projects in the desert southwest is difficult in large part due to the lack of monitoring studies in these environments. However, due to generally low known impacts for western wind projects, including the Dry Lake I Wind Project, and the low exposure risks at the wind park study area, it is unlikely that non-raptor populations would be affected by direct mortality from the operation of the wind-energy facility, and any impacts would be at the individual level and not at the population level. Estimated bird fatality rates at the Dry Lake I Wind Project were considered low to moderate and well within the range of other similar studies conducted in the Western U.S. and Rocky Mountain Regions (Thompson et al. 2011). Of the 24 birds that were found and identifiable to species, none were Federally protected under the ESA.

During migration, bird species within the wind park study area are at risk of turbine-collision; however, previous studies of Sub-study Area A (Young et al. 2009) do not suggest these species migrate in abundance over that portion of the wind park study area. RPMs as described in Table 2.7-1 would include construction requirements, post-construction monitoring and reporting requirements, and operational practices. Also, iterative operational practices aspects of the proposed ABPP, including an impact assessment for birds protected under the MBTA, would help address any take of migratory birds. This proactive approach would help ensure that the proposed wind park would be in compliance with the MBTA, and applicable significance thresholds defined in Section 3.2.2.1 would not be exceeded. Breeding bird species found at Sub-study Area A during 2007–2008 avian surveys (Young et al. 2009) do not suggest the potential for breeding rare or sensitive bird species within the wind park study area. Pre-construction raptor nest surveys would be conducted for the Spring or appropriate season immediately preceding construction in order to provide data on the location of raptor nest structures throughout the wind park project area so that project planning may be informed by the location of nesting raptors. Actions would be taken to help ensure no migratory birds, their nests, or nest contents would be harmed during construction (see RPM in Table 2.7). With the proposed pre-construction measures, effects on breeding rare or sensitive species within the wind park are not anticipated.

Breeding in the grassland and pinyon-juniper habitat are likely to be displaced from construction zones during the breeding season but the overall loss of habitat is not expected to be substantial and over time would be reduced as construction areas revert to native habitat. Results from studies at the Stateline wind-energy facility in Oregon and Washington (Erickson et al. 2004) and the Combine Hills facility in Oregon (Young et al. 2005) suggest a relatively small-scale impact of wind-energy facilities on grassland steppe nesting passerines. Transect surveys conducted prior to and after construction of the facilities indicated that grassland passerine use was significantly reduced within approximately 164 feet of turbine strings; areas further away from turbine strings did not have reduced bird use. The reduced use was attributed to temporary and permanent habitat loss/disturbance near the turbines. While it is likely that similar impacts would occur at the Grapevine Canyon Wind Park, the species subject to these impacts are typically common in grassland and pinyon-juniper habitats, but the impacts are not expected to exceed the significance thresholds.

Large numbers of songbirds have collided with lighted communication towers and buildings when foggy conditions and Spring or Fall migration coincide (Winkelman 1995; Manville 2009; NWCC 2010). Birds appear to become confused by the lights during foggy or low ceiling conditions, flying circles around lighted structures until they become exhausted or collide with the structure (Erickson et al. 2001). Most collisions at communication towers are attributed to the guy wires on these structures which wind turbines do not have. No large mortality events on the same scale as those seen at communication towers have been documented at wind energy facilities in North America (NWCC 2010). Additionally, the large mortality events observed at communication towers occurred at structures greater than 150 meters in height (Erickson et al. 2001), likely because most species of birds migrate at elevations of 270 meters or higher (Young et al. 2004; Young and Erickson 2006). Modern wind turbines are below 270 meters in height.

Migrants may be more vulnerable to wind turbine collision in locations that contain important stopover habitat and are sited with wind turbine generators. In such situations risk of avian collision with turbines may be elevated during take-off or landing from stopover habitat. The seasonal migration of birds through Arizona is thought to occur in a broad front throughout much of the state. The wind project study area contains a limited amount of stopover habitat for songbirds, waterfowl, and shorebirds in the forms of grassland, shrubland, pinyon-juniper woodland, and a few waterbodies; migrating birds utilize these areas during migration (Young et al. 2009).

Wind parks with year-round waterfowl use have shown the highest waterfowl mortality, although levels of waterfowl/waterbird mortality appear insignificant compared to use of the sites by these groups. The Top of Iowa Wind Farm is located in cropland between three Wildlife Management Areas (WMAs) with historically high use by migrant and resident waterfowl. During a recent study, approximately one million total goose-use days and 120,000 total duck-use days were recorded in the WMAs during the Fall and early Winter, and no waterfowl fatalities were documented during concurrent and standardized wind project fatality studies (Koford et al. 2005). Similar findings were observed at the Buffalo Ridge Wind Project in southwestern Minnesota, which is located in an area with relatively high waterfowl use. Snow geese (*Chen caerulescens*), Canada geese (*Branta Canadensis*), and mallards (*Anas platyrhynchos*) were the most common waterfowl observed. Three of the 55 fatalities observed during the fatality studies were waterfowl, including two mallards and one blue-winged teal (*Anas discors*) (Johnson et al. 2002).

Studies assessing the relative proportion of wind-energy collisions compared with other sources of anthropogenic mortality indicate that wind-energy impacts account for a small proportion of overall bird fatalities associated with human activities in North America (Erickson et al. 2003, 2005). Bird species that migrate long distances or at night are more likely to be killed by collisions with man-made structures (NWCC 2010; Arnold and Zink 2011) than year-round residents or diurnal migrants. However, a recent study (Arnold and Zink 2011) concluded that there was no correlation between relative collision mortality of selected bird species with man-made structures (WTGs, windows, communication towers, vehicles, etc.) and long-term population trends.

Of the non-raptor avian groups, passerines have been the most abundant avian fatality at newer generation wind facilities, often comprising more than 80 percent of the avian fatalities (Erickson et al. 2001). Both migrant and resident passerine fatalities have been observed. Based on species and date information, in some studies up to 70 percent of fatalities found were believed to be migrants (Howe et al. 2002); however, the estimates are highly variable and range from 0 to 70 percent. In general, the number of migrant fatalities is higher in wind projects in the eastern U.S. (Erickson et al. 2002). The overall national average for passerine fatalities at wind projects has been approximately 2.2 birds per turbine per year (Erickson et al. 2002). The annually adjusted fatality rate for all birds at the Dry Lake I Wind Project in eastern Arizona was 4.66 bird fatalities per turbine per year, or 2.21 bird fatalities per MW per year (Thompson et al. 2011).

A post-construction monitoring study would be implemented to determine the overall level of bird fatalities resulting from operation of the proposed wind park. In addition, avian and bat protection measures would be developed prior to construction to mitigate potential direct impacts to birds. RPMs would include construction requirements, post-construction bird monitoring and reporting requirements, and operational practices. With the iterative operational practices aspects of the proposed ABPP, the proposed project would minimize impacts to birds and applicable significance standards for birds would not be exceeded.

Impacts to Raptors (Wind Park)

Young et al. (2009) compared annual mean raptor use at Sub-study Area A with 36 other proposed or existing wind-energy facilities that implemented similar protocols and had data for three or four seasons. The annual mean raptor use at these facilities ranged from 0.09 birds per 20-minute survey to 2.34 birds per 20-minute survey. Mean annual raptor use at Sub-study Area A was 0.67 birds per 20-minute survey which is in the mid-range of all the sites studied. Raptor use at the nearby proposed Sunshine Wind Park was lower than that observed at Sub-study Area A in 2007–2008, with a peak seasonal use of 0.58 observed during the Fall, while Winter use was only 0.08 raptors observed, per 30-minute fixed point survey (WEST 2006).

Results from Altamont in California suggest that mortality for some species is not related to abundance (Orloff and Flannery 1992). American kestrels, red-tailed hawks, and golden eagles were killed more often and turkey vultures were killed less often than predicted based on abundance estimates. A recent report from the Buffalo Gap wind-energy facility in Texas, however, suggests that turkey vultures may show higher susceptibility to collision at larger wind turbines than previously believed for smaller turbines (Tierney 2007). Also, reports from the High Winds wind-energy facility in California document high American kestrel mortality. Relative use by this species at High Winds is six times that at the Altamont (Kerlinger 2005). It is likely that many factors, in addition to abundance, are important in predicting raptor mortality.

A high density of small mammal prey and the conditions favorable to high prey densities (Smallwood and Thelander 2004) have often been presumed to be the main factors responsible for the high raptor use. High prey densities relative to the surrounding landscape are not estimated to occur within the study area. Prairie dog colonies are believed to be most prevalent within Sub-study Area A, relative to other portions of the biological evaluation area (Appendix D.1). Use by raptors observed at Sub-study Area A was highest adjacent to prairie dog towns. Therefore, risk to raptors may be highest within portions of Sub-study Area A associated with prairie dog towns and decreased within other portions of the evaluation area. For comparison, the results of avian use surveys conducted at the proposed Sunshine Wind Park, which is located nearby and in similar habitats to Sub-study areas B and C of the proposed wind park, help substantiate this risk to raptors. Raptor use at the Sunshine Wind Park was estimated at 0.26 birds per 20-minute survey during Fall, Winter, and Spring (WEST 2006). Based on this information it is unlikely that the raptor use estimate derived at Sub-study Area A would be as high in other portions of the biological evaluation area (Sub-study areas B and C). In addition, siting of WTGs would avoid prairie dog towns (see Resource Protection Measures Table 2.7-1).

Exposure indices may provide some insight into what species might be the most likely turbine casualties based on site specific data on abundance and flight behavior. The index considers relative probability of exposure based on abundance, proportion of activity recorded as flying, and observed flight height of each species. The analysis is based on observations of birds made during the studies and does not take into consideration varying ability among species to detect and avoid turbines, habitat selection, or other factors that may influence exposure to turbines such as breeding or hunting behavior. Thus, the actual risk may be lower or higher than indicated by these data. Based on this analysis, turkey vultures had the highest relative exposure index among raptors followed by red-tailed hawks at Sub-study Area A (Young et al. 2009). While turkey vulture and red-tailed hawk casualties have been recorded at wind projects, they are generally not found in proportion to relative abundance. For example, at Altamont red-tailed hawk casualties were found more often and turkey vultures less often than predicted based on abundance (Orloff and Flannery 1992). Altamont contains approximately 5,400 turbines, most of which are small, older, lattice tower turbines which are not necessarily representative of new wind facilities. The latest raptor fatality estimates at Altamont, based on searches using 30–90 day search intervals, indicate that annual mortality averages 1.5 to 2.2 raptor fatalities per MW when adjusted for searcher efficiency and scavenging bias (Smallwood and Thelander 2004). This estimate is higher than estimates of raptor mortality at modern wind farms (Erickson et al. 2001; NWCC 2010). No raptor fatalities were documented at the Dry Lake I Wind Project during post-construction monitoring studies conducted during 2009–2010 (Thompson and Bay 2011). It consists of thirty 2.1 MW turbines and is located approximately 47 miles west of the wind park study area. This facility is the closest operational wind energy site to the wind park study area and post-construction fatality monitoring data recently became public (Thompson et al. 2011).

Based on species composition of the most common raptor fatalities at other western wind-energy facilities, species composition of raptors observed during field surveys, and considering the exposure indices calculated, the diurnal raptors at the wind park study area most likely at risk of turbine collision would be red-tailed hawk and American kestrel. Small numbers of fatalities of other raptors, including other falcons, accipiters, and northern harriers, may also occur over the life of the wind-energy facility, but are expected to be rare. Based on the seasonal use estimates, it is also expected that risk to raptors would be unequal across seasons with the lowest risk in the Winter, when very few raptors were observed, and highest during the Fall season, likely due to migrants passing through the area.

A post-construction monitoring study would be implemented to determine the overall level of raptor fatalities resulting from operation of the proposed wind park. In addition, avian and bat protection measures would be developed prior to construction to mitigate potential direct impacts to raptors. RPMs would include construction requirements, post-construction raptor monitoring and reporting requirements, and operational practices. With the iterative operational practices aspects of the proposed ABPP, the proposed project would minimize impacts to raptors and applicable significance standards for raptors would not be exceeded.

Some resources are considered more sensitive to indirect impacts such as disturbance or displacement, including nesting raptors and other sensitive species. Indirect effects caused by disturbance-type impacts, such as construction activity near an active nest or primary foraging area, have the potential to impact raptor species. Birds displaced from the wind-energy facility might move to areas with fewer disturbances, but lower quality habitat, with an overall effect of reducing breeding success. There have been few studies on raptor displacement at wind-energy facilities, and most of these have suggested indirect effects to be negligible or immeasurable (Howell and Noone 1992; Johnson et al. 2000; Madders and Whitfield 2006). In general, due to the low density of nesting raptors based on survey data (Young et al. 2009; Tidhar et al. 2011a), there is limited potential for nesting displacement of raptors at the proposed wind park. Observation of a no-disturbance buffer around known nests when siting turbines would further minimize potential for impact. Disturbance or displacement related impacts are expected to be minimal and significance thresholds would not be exceeded.

Impacts to Migratory and Breeding Birds, Including Raptors (Transmission Tie-line and Switchyard)

Bird species protected under the MBTA may be affected by the proposed transmission tie-line both directly and indirectly. Collisions may occur with resident birds foraging and flying within the project area or with migrant birds seasonally moving through the area. While construction and maintenance of the transmission tie-line would likely result in disturbance to and removal of habitat for some species, particularly those inhabiting grassland and pinyon-juniper woodland habitats within or adjacent to the transmission tie-line and switchyard, the total area impacted would be relatively small compared to surrounding similar habitat and construction activities would be short-term. The major habitat types that would be impacted by the transmission tie-line and switchyard are abundant throughout the region and are not unique habitat features. Thus, removal of habitat for construction of the transmission tie-line and switchyard is not expected to have impacts on resident and migratory birds that exceed the significance thresholds in the region since the removal would not substantially interfere with the movement of any migratory species for more than two reproductive seasons. To minimize and mitigate risk of potential avian collisions and electrocution, the transmission tie-line and any overhead collection lines would be designed according to APLIC's recommendations (APLIC 1994, 2006). Thus, the effects would not result in a downward trend toward Federal listing for any of the migratory species. In addition, the iterative operational practices aspects of the proposed ABPP would help address any take of migratory birds. Implementation of these RPMs would minimize project related impacts and help ensure that the proposed transmission tie-line would be in compliance with the MBTA. Applicable significance thresholds for migratory birds and raptors would not be exceeded.

Bird species inhabiting the Anderson Mesa IBA may be affected by the proposed transmission tie-line. While several smaller lakes do occur, none occur within or immediately adjacent to the transmission tie-line or switchyard. Larger lakes in the region (Lake Mary and Mormon Lake) are located over three miles from the proposed transmission tie-line alignment. The transmission tie-line and switchyard would be constructed across grasslands and pinyon-juniper woodlands which are important land cover components of the Audubon Society's IBAs; however, both of these habitat types are abundant throughout the Anderson Mesa and are not unique habitat features to the region. Thus, the removal of habitat for construction of the transmission tie-line and switchyard is not expected to affect the biological viability on resident and migratory birds in the region. While avian collision with the proposed transmission tie-line would remain an unavoidable risk, particularly for waterfowl species utilizing wetland areas adjacent to the transmission tie-line, implementation of the APLIC standards and the ABPP would serve to minimize this potential threat. Based on these measures and the small amount of habitat loss, the proposed project would not result in a downward trend toward Federal listing for migratory species.

Impacts to Bats (Wind Park)

Due to the current lack of understanding of bat populations in North America, the species and relative abundance of bats occurring within the wind park are difficult to determine. During acoustic bat monitoring conducted by WEST at Sub-study Area A of the proposed project in 2007 and 2008, bat activity (mean = 9.11 bat passes per detector-night) was relatively high compared to that observed at facilities in Minnesota and Wyoming where bat collision mortality was low, but it was much lower than activity recorded at sites in West Virginia and Tennessee where bat mortality rates were high. Bat activity at the nearby proposed Sunshine Wind Park was considerably lower with a mean of 2.48 bat passes per detector night (Gruver et al. 2009), suggesting decreased bat activity may occur in grassland and desert scrub areas associated with large portions of Sub-study areas B and C compared with observed detections in Sub-study Area A. No known bat hibernaculum or roosts of importance have been noted within the vicinity of the wind park study area by the AGFD or the USFWS.

Bat activity recorded by fixed ground detectors within the Dry Lake I Wind Project was 8.83 ± 0.76 bat passes per detector-night. Based on the expected relationship between pre-construction bat activity and post-construction fatalities, bat fatality rates at the Dry Lake I Wind Project would be expected to be similar to the fatality estimates at Summerview, Alberta, and Blue Sky Green Field, Wisconsin, which ranged between 14.62 and 24.57 bat fatalities per MW per study period. However, the actual fatality estimate for the Dry Lake I Wind Project was 4.29 bat fatalities per MW per year. This annually adjusted bat fatality rate would be considered moderate and well within the range of other similar studies conducted in the Western and Rocky Mountain Regions. These results imply that a different relationship between activity and fatality may exist in the desert Southwest.

Other western projects including those in California have generally shown relatively low impacts. The recently published Dillon, California fatality project showed a bat fatality rate of 2.17 fatalities per turbine per year (2.17 fatalities per MW per year) (Chatfield et al. 2009). A post-construction monitoring study would be implemented to determine the overall level of bat fatalities resulting from operation of the proposed wind park. In addition, avian and bat protection measures would be developed prior to construction to mitigate potential direct impacts to bats. RPMs would include construction requirements, post-construction bat monitoring and reporting requirements, and operational practices. With the iterative operational practices aspects of the proposed ABPP, the proposed project would minimize impacts to bats and applicable significance standards for bats would not be exceeded.

No known bat hibernacula of importance have been noted within the vicinity of the wind park study area by the AGFD or the USFWS; however, formal surveys have not been completed in this area by the project company or the AGFD to search for bat hibernacula. Arizona contains few documented hibernacula (10) and the wind park is not situated in an area which would be likely to contain large hibernacula relative to the surrounding region. Features with the highest probability of containing bat roosts or hibernacula (rocky features with caves or crevices such as canyon walls, large snags, or loose bark trees) are being avoided by the project. Field surveys conducted during Summer 2011 within the wind park study area (Tidhar et al. 2011b) identified an abandoned house which was occupied by roosting bats. This abandoned house is not located within the vicinity of wind turbines or other infrastructure proposed for the project and would be avoided.

Impacts to Bats (Transmission Tie-Line and Switchyard)

No known bat hibernacula or roosts of importance have been noted within the vicinity of the transmission tie-line or switchyard by the AGFD or the USFWS; however, formal surveys have not been completed in this area by the project company or the AGFD to search for bat hibernacula or roosts. Arizona contains few documented hibernacula (10) and the transmission tie-line is not situated in an area that would be likely to contain large hibernacula relative to the surrounding region. Features with the highest probability of containing bat roosts or hibernacula (rocky features with caves or crevices such as canyon walls, large snags, or loose bark trees) are rare along the transmission tie-line and absent from the switchyard.

Impacts to Big Game (Wind Park)

Due to the lack of data regarding impacts of wind energy development on big game, it is difficult to predict the effects of the proposed project components on antelope, mule deer, and elk populations, though based on information received from AGFD the following is anticipated: 1) potential displacement would be moderate for wintering individuals utilizing Sub-study Area A; 2) impacts during parturition would be low for the wind park study area as a whole; and 3) avoidance of portions of Sub-study Area A, and to a lesser extent Sub-study Area B, by migrating pronghorn would be possible. However, this effects analysis is based on telemetry data from individuals collared outside the wind park study area and it is possible that individuals trapped and collared within the wind park study area may exhibit different spatial use patterns.

Impacts to Big Game (Transmission Tie-line and Switchyard)

The proposed transmission tie-line may have indirect impacts on elk by providing public access into previously unused areas, although impacts would not affect overall elk habitat in the Forest or population trends for the species. The transmission tie-line and switchyard would result in the loss of less than 10 acres of ponderosa pine forest, representing less than 0.01 percent of estimated ponderosa pine forest habitat within the Forest. Age class composition of ponderosa pine in the area is not specifically understood at this time; however, observations during the site visit indicate only individual trees classed as early seral ponderosa pine may be present within the area identified as ponderosa pine forest. The loss of individual early seral ponderosa pine within the small area of ponderosa pine forest impact from the transmission tie-line would not affect elk habitat, habitat use, or population trends within the Forest. The species preferred summer habitat (mixed-conifer and spruce-fir forests) are absent from the area immediately adjacent to the transmission tie-line and switchyard; however, pinyon-juniper woodlands in the area likely support wintering elk. While the proposed transmission tie-line and switchyard would permanently remove up to 25 acres of pinyon-juniper woodland, there are roughly 630,000 acres of pinyon-juniper woodland within the Forest. This habitat type is abundant in the region and not a unique habitat feature. Construction activities may cause short-term disturbance on elk behavior or movement in the local area. Operation of the transmission tie-line and switchyard is not anticipated to have long-term impacts on elk behavior or movement patterns. Population trends and habitat viability associated with this species would not be impacted by construction and operation of the transmission tie-line and switchyard.

The proposed transmission tie-line and switchyard also may have indirect impacts on mule deer; however, impacts would not affect overall deer habitat within the Forest or population trends for the species. Aspen forests are absent from the area and, while the proposed transmission tie-line and switchyard would permanently remove up to 25 acres of pinyon-juniper woodland, there are roughly 630,000 acres of pinyon-juniper woodland on the Forest. This habitat type is abundant in the region and not a unique habitat feature. Population trends and habitat viability associated with this species would not be impacted by construction and operation of the transmission tie-line and switchyard.

The proposed transmission tie-line and switchyard may have indirect impacts on antelope; however, impacts would not affect overall habitat in the Forest or population trends for the species. Open grassland, the species preferred habitat, is the dominant habitat type comprising the transmission tie-line and switchyard. Construction activities may result in short-term impacts to grassland habitats preferred by the species, however, grassland occurs over 151,000 acres within Management Area 10, which includes Anderson Mesa, as required by Forest BMPs. Temporary construction impacts to grassland would be mitigated through vegetation restoration. Construction may also result in short-term changes in pronghorn movement or behavior if pronghorn occur in the project area during construction. Operation of the transmission tie-line and switchyard would not be expected to have an effect on pronghorn populations. Given the small acreage of grassland habitat impacted by the proposed transmission tie-line and switchyard, and the fact that this habitat type is abundant throughout the region, the Anderson Mesa pronghorn population trends and habitat viability would not be impacted by construction and operation of the transmission tie-line and switchyard.

3.2.2.3 Alternative Transmission Tie-line Corridor

Impacts described above would be similar to the impacts that would result from the implementation of Foresight's proposed transmission tie-line alignment. The location of the alternative alignment is within one-half mile of the proposed alignment, and similar biological conditions exist along this alignment.

3.2.2.4 No Action Alternative

Biological resources would not be disturbed or otherwise affected if the wind park, transmission tie-line, and switchyard were not constructed. As a result, no impacts to biological resources would be expected.

3.3 CULTURAL RESOURCES

This section provides contextual background information on cultural resources in proximity to the wind park study area, transmission tie-line, and Western's switchyard including the area's prehistoric, ethnographic, and historical settings. This section also summarizes the results of previous cultural surveys in the vicinity and analyzes the proposed project's potential impacts on cultural resources. Cultural resources include archaeological sites, historic structures and features, as well as Traditional Cultural Properties (TCPs) that are important to a community's practices and beliefs and that are necessary to maintain a community's cultural identity.

Information on cultural resources was derived from a number of sources. A Class I (literature search) report (Duncan et al. 2010) was prepared for Western. For this report record searches were conducted at the Arizona State Museum, Arizona SHPO, and Forest Service. In addition, historic maps and documents were researched at the BLM, including General Land Office maps and homestead and mining patents. Consultation was also carried out with experts knowledgeable in the cultural resources of the area. Class III Intensive pedestrian surveys were conducted in May, July, and October 2010 and March 2011 of the switchyard, transmission tie-line, tie-line access road, and the wind park site access road.

Pedestrian survey in May 2010 consisted of two Transcon Environmental, Inc. (Transcon) archaeologists and two Zuni Heritage and Historic Preservation Office (ZHHPO) archaeologists walking 15-meter transects providing 100 percent coverage of the interconnection switchyard footprint, a 200-foot area of potential effect (APE) outward in all directions of the perimeter, as well as a 100-foot-wide APE of the switchyard access road and a 300-foot-wide APE of the new 345-kV transmission tie-line. In July 2010, a second field visit by one Transcon and one ZHHPO archaeologist occurred to record cultural resources that were identified during the May 2010 surveys. One Transcon archaeologist returned in October 2010 with an archaeologist specializing in the prehistoric ceramic types of the region to further record identified cultural resources. In March of 2011, one Transcon archaeologist, one Western archaeologist, and two archaeologists from the Hopi Cultural Preservation Office conducted a pedestrian survey consisting of 15-meter transects covering 100 percent of a 150–200 feet APE centered on the access road alignment beginning at Meteor Crater Road, across Diablo and Yeager Canyons, and ending at the boundary of the wind park study area.

3.3.1 Affected Environment

3.3.1.1 Resource Evaluation Area

The cultural resources evaluation area is based on information derived from the executed Programmatic Agreement (PA) for the project and includes the wind park study area, the proposed site access road, transmission tie-line, and switchyard and an area one mile around the perimeter of the switchyard and on each side of linear portions (the transmission tie-line and site access road) and within three miles of the wind park study area to account for indirect visual effects.

3.3.1.2 Characterization

Regulatory Background

Federal agency responsibilities with regard to cultural resources are addressed by a number of laws, implementing regulations, EOs, PAs, and other requirements. These include the NHPA of 1966, Native American Graves and Repatriation Act (NAGPRA), American Indian Religious Freedom Act (AIRFA), Executive Order (EO) 13007 "Native American Religious Practices," and EO 13175 "Consultation and Coordination With Indian Tribal Governments."

The principal Federal law addressing cultural resources is the NHPA, as amended (16 USC 470), with its implementing regulations (36 CFR Part 800). NHPA describes the process for identifying and evaluating historic properties; assessing the effects of Federal actions on historic properties; and consulting to avoid, reduce, or minimize adverse effects. The term "historic properties" refers to cultural resources that meet specific criteria for eligibility for listing on the NRHP. Section 106 of the NHPA requires that Federal agency decisions affecting these places consider cultural and historic values and the options available to protect these properties. Section 106 also requires consultation with Indian tribes whose traditional lands could be affected by "undertakings." EO 13175 delineates the Government-to-Government Relationship between Native American Tribal Governments and Federal agencies through which these consultations must occur. NAGPRA was enacted in 1990 to protect Native American burials, associated funerary objects, and objects of cultural patrimony encountered on Federal land. The AIRFA and EO 13007 both pertain to Native American sacred sites. EO 13007 states that Federal agencies must "to the extent practicable and not clearly inconsistent with essential agency functions, accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites."

Western, as the lead Federal agency, is responsible for identifying, evaluating, and assessing effects of construction and operation of the proposed project on cultural resources in concurrence with SHPO, land managing agencies, and other consulting parties. These responsibilities have been outlined in a PA that has been executed by Western, the Forest, the SHPO, and the Advisory Council on Historic Preservation (ACHP), and other concurring parties, including Foresight, the Arizona State Museum, and Tribes. As is common practice, this Final EIS does not present the exact locations of cultural resources (including historical sites, prehistoric archaeological sites, and TCPs) in an effort to help preserve those sites from vandalism.

Cultural History

Prehistoric Period (11,500 B.C.–A.D. 1500)

The earliest evidence of human occupation in Arizona dates to the Paleoindian Period roughly 11,500 years ago. Paleoindian groups were known for mobile, hunting-based lifestyles with an emphasis on the exploitation of megafauna. The Clovis complex, the earliest undisputed culture during this time period, is strongly evident in southeastern Arizona (Danson 1961; Huckell 1982; Downum 1993). However, Geib and Pilles have compiled evidence of the occupation of Paleoindian groups in northern Arizona and have documented the discovery of Clovis points near the project area, specifically Anderson Mesa, Anderson Canyon, and Dog Valley (Geib and Pilles 2000).

Major environmental changes and the extinction of megafauna marked the beginning of the Archaic Period (7500 B.C.–A.D. 500) and prompted a shift in subsistence strategies. Archaic groups are characterized by their use of diverse plant resources and their adaptation to hunting smaller game. Within the Flagstaff region, knowledge of this period is derived from scattered Archaic-style points and a limited number of archaeological sites (Windmiller and Huckell 1973; Bremer 1989; Anderson 1990; Keller and Dosh 1996). Archaic period points and possible Late Archaic sites have been located in the area surrounding the project (Wilson 1969; Batcho 1982).

The Formative Period is characterized by the emergence of a ceramic tradition. The associated cultural group within the Formative Period, termed the Sinagua by Colton, occupied the Flagstaff area from roughly A.D. 600 to 1400 (Colton 1939; Reid and Whittlesey 1997). Regionally, the Sinagua are situated amidst the major cultural units of the Southwest—the Mogollon, Anasazi, Patayan and Hohokam. Two distinct Sinagua populations distinguish themselves within the archaeological record due to their regionally diverse material cultures and adaptations to different environmental zones. These groups are known as the Northern Sinagua, located in and around Flagstaff (including the project study area), and the Southern Sinagua, situated in Verde Valley (Colton 1946).

From their pottery, early pithouse styles, and later rectangular ceremonial structures (kivas), the Sinagua seem to be a regional variation of the Mogollon cultural tradition and are recognized by their locally manufactured brownwares and a general lack of decorated pottery. Being located at the interface between several cultural groups, non-local material culture attributes, such as Hohokam-like pithouses and ballcourts, are occasionally found (Fish et al. 1980; Cordell 1984). Whether these shared cultural traits indicate population movement between groups, extensive trade networking, or some combination of both, is still debated.

The Hopi claim ancestry to the Sinagua and other Ancestral Puebloan groups. The Zuni claim ancestry to all Ancestral Puebloan groups, including the Sinagua. Archaeological sites in and around the project study area could show evidence of Ancestral Puebloan cultures and thus, could be of interest to the Zuni and the Hopi people. The Zuni recognize the project study area and the areas surrounding it to have important cultural and religious meaning. Archaeological sites, trails, petroglyphs, and shrines that are located within or near the project study area are viewed as a physical record that this area is a part of the Zuni cultural landscape and figured prominently in Zuni history. Chavez Pass, which is located immediately to the south of the wind park study area, is an area of interest to both the Hopi and Zuni people. Canyon Diablo, which runs southwest/northeast within the wind park study area, and Meteor Crater to the northeast, are both important religious areas for the Zuni. The San Francisco Peaks, visible from the wind park, are important to the Zuni for medicinal plant, minerals, and pinyon nut collecting activities. Thus, the ZHHPO states that the project study area and surrounding area play a “significant role in the continuation of the cultural identity of the Zuni people” (ZHHPO 2010).

Hopi traditions recognize Chavez Pass as an ancestral gateway on a prehistoric route located south of the project study area (Pilles 1987). This trail, part of an extensive prehistoric trade route from New Mexico through north-central Arizona, was used for more than 1,200 years and has been named the "Palatkwapi Trail" by historian James Byrkit (Byrkit 1988a). Zuni traditions also recognize Chavez Pass as a sacred place where the A:Shiwi separated during their migrations. Zuni cultural advisors identified shrines and petroglyphs at Chavez Pass during a field visit in April 2010 that supports this traditional oral history (ZHHPO 2010). Canyon Diablo contains important Zuni ancestral migration sites for the Zuni and both Canyon Diablo and Meteor Crater have names in the Zuni language (ZHHPO 2010).

> *The Zuni believe that these places are still spiritually inhabited by their ancestors and that their preservation is vital to maintaining a harmonious balance with nature and the spiritual world. The Zuni believe that physical disturbances to these sacred places can cause an imbalance in the natural and spiritual worlds* (ZHHPO 2010).

Sinagua chronology is related to a major eruption that occurred in the Flagstaff area resulting in the creation of Sunset Crater (McGregor 1936; Colton 1960; Pilles 1979). Some researchers postulate that the eruptions lasted as late as 1250 AD, but most accept a late 11th century date. The Sinagua chronology is divided in terms of pre-eruptive and post-eruptive phases initially established by Colton and still in use today (Colton 1946; Pilles 1988).

The three pre-eruptive phases are known as Cinder Park (A.D. 600 to 700), Sunset (A.D. 700 to 900), and Rio de Flag (A.D. 900 to roughly 1066) (Pilles 1988). According to Pilles, the ceramics, architectural styles, settlement plans, and subsistence strategies were fairly uniform throughout these phases (1979). During this time the Sinagua were characterized as "hunter-gathers and farmers living in small to medium-sized pit house villages" (Kamp and Whittaker 1999). Sites dating to these phases have been discovered in and around the project study area (Wilson 1969; Henderson 1979; Batcho 1982).

Post-eruptive phases began with the Angell-Winona (A.D. 1064 to 1100) and Padre (A.D. 1100 to 1150) phases (Kamp and Whittaker 1999). During this phase there existed a variety of pithouse forms, but the classic Angell house with an entry/alcove to the east is most common. Populations settled at lower elevations among the pinyon-juniper zones as opposed to settlement locations in the higher ponderosa zone, preferred in previous phases. Masonry architecture is common during the subsequent Padre phase, including rectangular masonry-lined pit houses, field houses, above-ground structures, and community rooms (Pilles 1996).

The Elden phase (A.D. 1150 to 1250) marked a peak in Sinagua culture characterized by the construction of large pueblos, extensive agricultural systems, and numerous field houses (Pilles 1978; Reid and Whittlesey 1997). Agricultural features during this phase included terraces, check dams, reservoirs, linear border, and grid border systems (Kamp and Whittaker 1999). Population was concentrated in locations north and east of Flagstaff and in the Anderson Mesa area to the south. "Forts" were built atop hills and high cinder cones during this time, but their primary function is still unknown (Pilles 1987).

The final two phases, Turkey Hill (A.D. 1250–1300) and Clear Creek (A.D. 1300–1400), were periods of decline and abandonment (Reid and Whittlesey 1997). According to researchers, hardships were likely due to unfavorable environmental conditions (McGregor 1965; Downum 1988, 1992). The Turkey Hill phase is noted for the reduction or abandonment of settlement units and agricultural systems.

After A.D. 1425, complete abandonment of the large pueblo towns occurred, and the Sinagua culture disappeared as a distinct entity from the cultural landscape. Archaeological evidence as well as Hopi oral traditions indicates that the remaining Sinagua moved to the Homol'ovi sites and then later to the Hopi

Mesas, where their descendants still live today (Pilles 1987; Reid and Whittlesey 1997). Hopi and Zuni traditions suggest some of the Anderson Mesa Sinagua moved to the Zuni area as well.

Historic Period (A.D. 1540–1930)

Spanish exploration of the region reportedly began when Coronado's men visited the Hopi Mesas and the Grand Canyon in the 1540s (Cline 1976). Later, members of the Antonio de Espejo expedition traveled through Chavez Pass in 1583. Historians speculate that Espejo's route followed the prehistoric Palatkwapi Trail through Sunset and Chavez Passes and south into the Verde Valley (Bartlett 1942; Hammond and Rey 1966; Byrkit 1988a). In 1598 Spanish explorer Marcos Farfan de los Godos, under the leadership of Juan de Onate, reportedly traveled along the same trail in search of silver mines (Cline 1976). By 1604, Onate and the Farfan party returned to New Mexico via the same route (Stein 1994). Franciscan missionaries established a series of missions on the Hopi Mesas in 1629, but were driven out a few decades later (Cline 1976). Through the rest of the 17th century, no renewed Spanish exploration or missions occurred in the region (Wilson 1969).

In the project vicinity two trails, the Thirty-Fifth Parallel and the Palatkwapi Trail, were used extensively by sheep herders prior to the American Period. The Thirty-Fifth Parallel trail was part of the famous sheep herding route from New Mexico to California (Cline 1976; Neff 1984). This trail, used mainly by Spanish and Basque herders, was located north of the project study area. The Palatkwapi Trail, previously mentioned as a prehistoric trade route, served as a sheep herding trail for Anglo, Spanish, and Basque herders before and into the American Period (Byrkit 1988a).

Interest in the Flagstaff and Winslow areas was rekindled after the Treaty of Guadalupe Hidalgo was signed in 1848 to end the war with Mexico (Byrkit 1988a). As a result, the first American expeditions to the region are documented with journeys by Captain Lorenzo Sitgreaves in 1851 and Lieutenant Edwards F. Beale in 1857 (Cline 1976). Stories of Navajo groups hiding in Canyon Diablo to escape and combat Anglo travelers were validated with the location of a few sites within the canyon, but outside of the project study area (Wilson 1969). European discovery of a giant crater formed by meteor impact, a major landmark later known as Meteor Crater, drew scientists to the area at the end of the 19th century.

Chavez Pass was named for Colonel J.F. Chavez who escorted the territorial government party from Santa Fe to Fort Whipple in 1863 (Neff 1984). Chavez's routes were associated with a military and stage coach road, and he traversed the project study area on several other occasions during 1864 (Byrkit 1988a; Byrkit 1988b). According to these sources, Chavez never passed directly through the pass that now carries his name.

Sheep and cattle herding along with lumber became major industries in and around Flagstaff in the late 1800s. A populous Basque community resided in Flagstaff due to their role in the local sheep industry (Stein 1991). During this period a major sheep operation owned by Anglo sheep herders, the Daggs brothers, was headquartered near Chavez Pass (Neff 1984). Wild horses were rounded up for military use during World War I in the Anderson Mesa area and a few remnants of the corrals still exist.

The Star Line Transportation Company established a stage coach route from Prescott to Santa Fe with Chavez Pass as a stop (Byrkit 1988a). However, the establishment of the Atlantic and Pacific Railroad through Flagstaff in 1882 resulted in fewer travelers utilizing the older route through Chavez Pass (Byrkit 1988a). The railroad, situated along the Thirty-Fifth Parallel, led to the growth and development of towns along the line, such as Flagstaff and Winslow.

The Forest was established in July 1908 and serves as the western edge of the wind park study area. Homesteads and livestock operations occurred in and around the project study area due to favorable laws such as the Homestead Act of 1862 and the Stock-Raising Homestead Act of 1916 (Neff 1984). Eleven homesteads were established within the project study area during the 1920s and 1930s, although the Christian Jurgenson homestead dates to 1898. Fourteen stock raising homesteads were established between 1922 and 1936. In addition, a mineral lands patent was obtained to quarry the rock at Meteor Crater. By the 1930s, the project study area was mainly used by the Bar T Bar Ranch Corporation for the Winter ranging of cattle (Neff 1984).

Previous Sites and Surveys

Records were checked at the Arizona State Museum, Arizona SHPO, the Forest, and the AZSITE on-line cultural resources database. Searches were conducted to determine whether previously identified cultural resources were present or if previously reported archaeological investigations had been conducted within the evaluation area.

Background research identified 69 previously conducted surveys within the resource evaluation area; 23 of these surveys overlap or occur within 100 feet of the wind park study area, transmission tie-line, and/or switchyard.

The Class I Cultural Resources Overview prepared for the project identified 678 previously recorded cultural resources within the cultural resources evaluation area, of which 24 sites potentially overlap or occur within 100 feet of the wind park study area, transmission tie-line, and/or switchyard. Previously identified sites consist of both prehistoric and historic manifestations. In general, the research indicates a relatively low density of sites within the wind park study area and the two primary access routes originating from Meteor Crater Road. The Class I Cultural Resources Overview indicates that the 345-kV transmission tie-line could extend through areas of higher site density that could include large prehistoric habitation sites and historic structures. Low site density is found in the vicinity of Western's proposed switchyard.

TCPs could be present within the cultural resources evaluation area. Western has initiated consultation with the Hopi and Zuni Tribes and the Navajo Nation, and consultations are ongoing. These consultations are being conducted to evaluate TCPs and support Western's and the Forest Service's government-to-government consultations with the tribal governments and appointed tribal staff. Tribal cultural staff members have been invited to participate in cultural resource surveys and to conduct ethnographic and TCP studies. In April 2010, representatives from the Zuni tribe accompanied by Western archaeologists and one archaeologist from Transcon were flown by helicopter over the project area and were taken by foot to requested locations of interest adjacent to the project area. As a result of this field visit, the ZHPPO produced a report titled *Zuni Traditional Cultural Property Assessment and Cultural Issues Associated with the Proposed Wind Project, Coconino County, Arizona* and submitted the report to Western in June 2010. Two members of the ZHPPO subsequently participated in a pedestrian survey of the proposed switchyard and transmission tie-line proposed on Forest-managed lands. Two representatives from the Hopi Tribe later participated in pedestrian survey of the proposed wind-park access road and were accompanied by a Western archaeologist and Transcon archaeologist to areas of tribal interest adjacent to the project area. Consultations would continue into the construction stages of the proposed project.

The Class III Intensive Pedestrian Survey conducted in May, July, and October 2010 of the proposed switchyard and transmission tie-line and March 2011 for the proposed access road identified 12 previously unrecorded archaeological sites and seven rock cairns that are of interest to the Hopi. Western would consult with the signatories to the PA to determine site eligibility to the National Register. Class III Intensive Pedestrian Surveys would be completed for the wind park study area before construction begins and the results of all surveys would be provided in a Class III Cultural Resources report. All consulting parties including the SHPO, Tribes, and the Forest Service would receive the Class III Cultural Resources report for review and comment prior to construction. Table 3.3-1 summarizes the newly recorded archaeological sites known at the time of the writing of this EIS.

TABLE 3.3-1
NEWLY RECORDED ARCHAEOLOGICAL SITES

Site Number	Site Type	Cultural Affiliation	Location
FS-05-654	petroglyph	Sinagua	transmission tie-line
FS-05-655	petroglyph	Sinagua	transmission tie-line
FS-05-656	temporary habitation site (ceramic / lithic scatter)	Sinagua	transmission tie-line
FS-05-657	temporary habitation site (ceramic / lithic scatter)	Sinagua	transmission tie-line
FS-05-658	temporary habitation site (ceramic / lithic scatter)	Sinagua	transmission tie-line
FS-05-659	agricultural site	Sinagua	transmission tie-line
FS-05-660	temporary habitation site (ceramic / lithic scatter)	Sinagua	transmission tie-line
FS-05-661	temporary habitation site (ceramic / lithic scatter)	Sinagua	transmission tie-line
FS-05-662	temporary habitation site (ceramic / lithic scatter)	Sinagua	transmission tie-line
Field Site 1	Historic artifact scatter and coral associated with ranching and prehistoric artifact scatter	Historic / Prehistoric	access road
Field Site 2	historic stone structure remains	Historic	access road
Field Site 3	prehistoric lithic scatter	Prehistoric	access road
Rock Cairns 1–7	rock cairns scattered between Diablo Canyon and Chavez Pass	Unknown	access road

3.3.2 Environmental Consequences

3.3.2.1 Standards of Significance

Of the 24 previously recorded sites potentially overlapping or occurring within 100 feet of the wind park study area, transmission tie-line, and/or switchyard, four are eligible for listing on the NRHP. To define the criteria for impact evaluation, thresholds of significance for a given environmental effect are provided for cultural resources. Significance of any cultural resources is determined following the criteria for eligibility for nomination to the NRHP, as defined in 36 CFR Part 60.4. The NRHP criteria states:

> *The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, building(s), structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and*
>
> *a) That are associated with events that have made a significant contribution to the broad patterns of our history; or*
> *b) That are associated with the lives of persons significant in our past; or*
> *c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess*

high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

d) *That have yielded, or may be likely to yield, information important to history or prehistory.*

If resources are determined to be eligible for listing on the NRHP, and SHPO concurs with Western's determination, these resources are then considered significant and the agency must avoid or lessen the impacts to them. If it is not possible to avoid one or more of these eligible sites, a treatment plan would be developed through consultation with Indian Tribes, land managing agencies, State and local agencies, public, and the ACHP to mitigate project-related effects.

A significant impact on cultural resources could result if any of the following were to occur from construction or operation of the proposed project components:

- Damage to, or loss of a site of archaeological, Tribal or historical value that is listed, or eligible for listing, on the NRHP.
- Loss or degradation of a traditional cultural property or sacred site, or if the property or site is made inaccessible for future use.
- Disturb human remains, including those interred outside of formal cemeteries.

3.3.2.2 Foresight's Proposed Project and Proposed Federal Actions

Research identified 678 previously recorded cultural resources within the cultural resources evaluation area for the proposed project facilities. Twenty-four of the sites potentially occur within 100 feet of the wind park study area, transmission tie-line, and/or switchyard. Of the 24 sites, 4 of these are recommended as eligible for listing on the NRHP. The preliminary layout plan was prepared to avoid impact to these sites. Western would consult with the signatories to the PA to determine the National Register site eligibility for 12 newly recorded sites and seven rock cairns based on the Class III pedestrian surveys completed for the proposed switchyard, transmission tie-line, and wind park access road, and newly recorded sites for the other project components. Western and the Forest Service's goal is to achieve a no adverse effect by avoiding National Register-eligible cultural resources to the extent feasible and practical. Provisions of the PA provided in Section 2.7 (Foresight and Agency Resource Protection Measures) state that a reasonable effort would be made to design the project in such a manner as to minimize impacts to NRHP listed and eligible properties. This could include siting project facilities to avoid specific cultural resource sites.

The development of wind park and transmission tie-line facilities could also indirectly impact areas of interest to Native Americans, such as sacred areas, or areas used for collecting traditional resources, such as birds and medicinal plants. Visual impacts on significant cultural resources, such as sacred landscapes, historic trails, and viewsheds from other types of historic properties (e.g., homes and bridges) could also occur. In addition, there could be visual impacts on TCPs because the visible wind turbines could be perceived as an intrusion on a sacred or historic landscape that could result in a significant adverse effect to these TCPs. TCPs are currently being evaluated through tribal consultation.

As previously described, a PA has been executed by Western, the Forest, Arizona SHPO, and the ACHP. Foresight has signed the PA as a concurring party. The PA, prepared by Western and reviewed by consulting parties, establishes the area of potential effect for the proposed project, describes survey methodology, proposes a treatment plan for identified resources that cannot be avoided and describes procedures for unanticipated discoveries.

Foresight would avoid, to the extent possible, areas containing identified resources. Further, the PA would address options for the treatment of historic properties, and specific mitigation measures would reduce impacts to sensitive resources so that there would be no adverse effect on cultural sites. Class III surveys on all proposed disturbance areas would be conducted prior to land disturbance for construction.

3.3.2.3 Alternative Transmission Tie-line Corridor

Construction and operation of the alternative transmission tie-line would not result in substantial difference to the impacts of cultural resources in the area. The location of the alternative alignment is within one-half mile of the proposed alignment and would have a similar cultural resources density.

3.3.2.4 No Action Alternative

Cultural resources would not be encountered or otherwise affected if the wind park, transmission tie-line, and switchyard were not constructed. As a result, no impacts to cultural resources would occur.

3.4 GEOLOGY AND SOILS

3.4.1 Affected Environment

3.4.1.1 Resource Evaluation Area

The geology and soils evaluation area for this analysis is the footprint of the wind park study area, transmission tie-line, and Western's switchyard. Maps, data, and publications about local soils and geological resources were gathered from websites maintained by NRCS, U.S. Geological Survey (USGS), and the Forest Terrestrial Ecosystem Survey. This information was used for supporting geology and soils analysis, and project planning and implementation.

3.4.1.2 Characterization

Geomorphology and Geology

The geology and soils evaluation area is situated just above the Mogollon Rim at the southern boundary of the Colorado Plateau. It is located between Anderson Mesa and the Little Colorado River in a section of the Colorado Plateau known locally as the Mogollon Plateau. Basement rock is Kaibab limestone and, below that, Coconino sandstone that formed in the Permian period at the end of the Paleozoic era. Both limestone and sandstone are sedimentary rock laid down 286 to 245 million years ago (USGS 1997). Late in the Permian, the region was uplifted above a sea and eroded into a plain incised by shallow stream channels (Cronic 1983). The Plateau was uplifted again about five million years ago, this time tipping toward the north and establishing present-day stream channels (Foos 1999).

About 50,000 years ago, an iron mass plunged into the earth creating Meteor Crater, located approximately five miles southeast of the intersection of I-40 and Meteor Crater Road. The meteorite crashed and exploded, creating a vast hole and rim in the Kaibab limestone bedrock. The impact threw fragments of the meteorite onto the area including Canyon Diablo (Chronic 1983).

Mineral Resources

The geology and soils evaluation area does not have deposits of oil, natural gas, or minerals that would be used in industrial or energy applications (Arizona Geological Survey 2009). Sand and gravel are common resources in the region.

Geologic Hazards

Four million years ago, volcanic activity was a hazard near present-day Flagstaff and Springerville. The most recent eruptions occurred over a 150 year period beginning in 1064, at Sunset Crater located approximately 35 miles northwest of the evaluation area. However, there is no evidence of frequent small earthquakes caused by the movement of molten rock or other activities that normally signal renewed activity (Fellows 2000). Fewer than ten shallow earthquake episodes have been recorded in the area south and east of Flagstaff since 1990. There is a 25 percent probability of a magnitude 5.0 or greater earthquake occurring in the next 50 years within 30 miles of the geology and soils evaluation area (USGS 2009). Figure 3.4-1 depicts the probability of an earthquake in the general vicinity of the evaluation area. There are several small fault zones within 25 miles of the evaluation area. The closest faults in Quaternary rock strata are the Rock House and Leupp faults, located north and west of I-40, and the Lake Mary and Mormon Lake fault zones located on Anderson Mesa.

Soils

The geology and soils evaluation area is almost 100,000 acres in size and has many soils formed from lithic bedrock. Mapped soil units are listed in Table 3.4-1 and their general locations are depicted on Figure 3.4-2 (wind park study area) and Figure 3.4-3 (transmission tie-line and switchyard).

Three soils, Deama, Epikom, Winona and their associated map units, account for 96 percent of the soils within the wind park study area. Deama and Winona soils are shallow and well-drained, formed from limestone and sandstone. Unweathered bedrock is often 19 to 23 inches beneath the surface with substantial stony, cobbly, and gravelly components in the subsoil layers. Epikom complex occurs on shallow to steep slopes. These soils have low potential to respond to frost or corrode concrete foundations. Most soils make poor natural road surfaces because of low strength, presence of a restrictive layer, and the potential for erosion and rutting.

Soils on lands managed by the Forest Service (depicted in Figure 3.4-3) within the proposed transmission tie-line and alternative transmission tie-line rights-of-way are mapped as part of the Forest Service's Terrestrial Ecosystem Survey. The vast majority of these soils are deep, well-drained, and weathered from basalt and related volcanic rocks (Hendricks 1985). Most of these soils are fine-textured (clayey), are moderately susceptible to erosion (moderate erosion hazard), and have severe limitations as a natural road base due to low strength and high shrink-swell hazard.

FIGURE 3.4-1

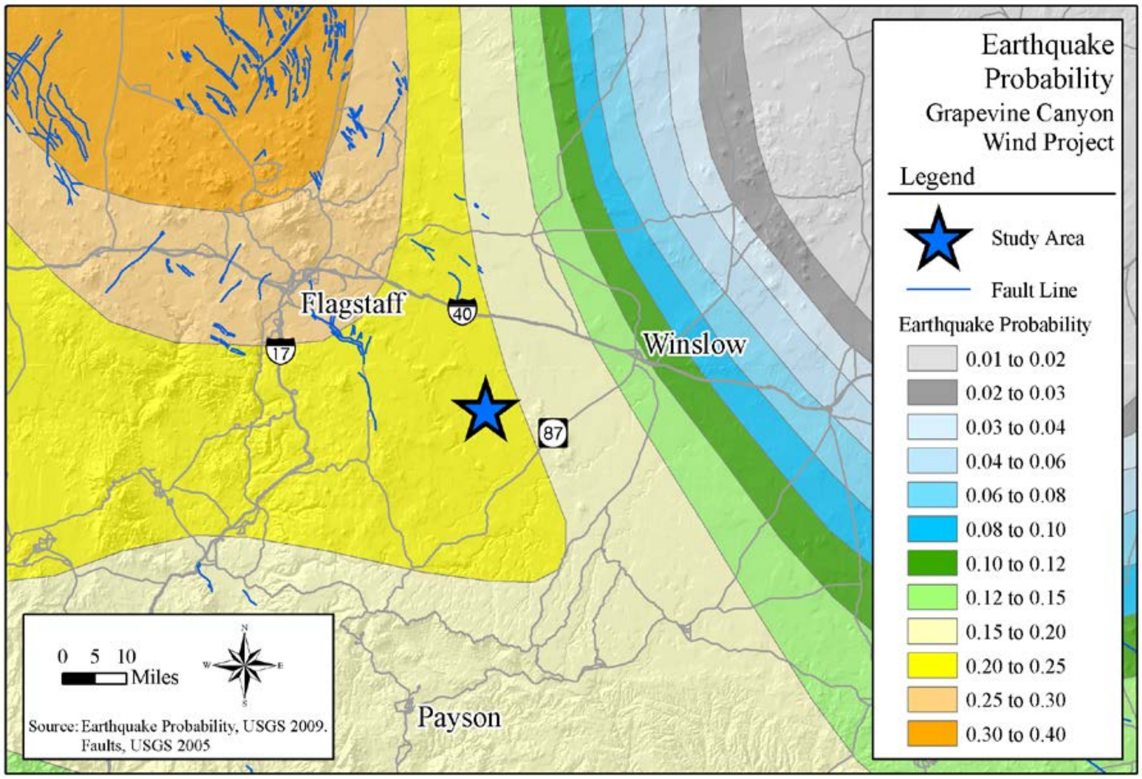


TABLE 3.4-1
MAPPED SOILS

Map Key	Soil Name	Area (acres)	Area %	Slope	Erosion Hazard		Corrosion Hazard Uncoated Steel	Limitations for Roads	Runoff Potential
					Water	Wind			
10	Deama gravelly loam	8,460	9%	2–15%	high	low	moderate	severe	high
11	Deama stony loam	13,032	14%	1–15%	high	low	moderate	severe	high
13	Deama-Toqui complex	1,440	2%	0–8%	high	low	moderate	severe	high
18	Epikom complex	3,974	4%	0–15%	high	low to moderate	high	severe	high
19	Epikom-Rock outcrop complex	—	<1%	8–60%	high	low	high	severe	high
29	Paymaster-Lynx association	871	<1%	gently sloping	low	low to moderate	moderate	moderate	moderately low
37	Rune silty clay loam	891	<1%	0–8%	low	low	high	low moderate	moderately high
38	Rune-Disterheff association	502	<1%	gently sloping	low	low	high	moderate	moderately high
39	Servilleta fine sandy loam	105	<1%	1–8%	moderate	moderate	high	moderate	moderately high

TABLE 3.4-1 MAPPED SOILS										
Map Key	**Soil Name**	**Area (acres)**	**Area %**	**Slope**	**Erosion Hazard**		**Corrosion Hazard Uncoated Steel**	**Limitations for Roads**	**Runoff Potential**
					Water	**Wind**			
40	Servilleta-Tusayan complex	700	<1%	1–8%	moderately high	low to moderate	high	moderate	moderately high
44	Springerville very stony clay	235	<1%	0–8%	moderate	low	high	severe	high
48	Thunderbird-Rock outcrop complex	450	<1%	30–60%	moderately high	none	high	severe	high
49	Thunderbird-Springerville association	484	<1%	strongly sloping	moderately high	low	high	severe	high
55	Tusayan-Lynx association	232	<1%	gently sloping	low to moderately high	low	high	moderate	moderately low to moderately high
60	Winona gravelly loam	35,194	37%	0–8%	high	low	moderate	severe	high
61	Winona stony loam	11,881	13%	0–8%	high	low	moderate	severe	high
62	Winona-Boysag gravelly loams	218	<1%	0–8%	high	low	moderate	severe	high
64	Winona-Rock outcrop complex	7,022	7%	15–30%	high	low	moderate	severe	high
65	Winona-Rock outcrop complex	3,659	4%	30–70%	high	low	moderate	severe	high
66	Winona-Tusayan association	5,448	6%	gently sloping	high	low	moderately high	severe	high
436	Lithic and Calcic Ustochrepts-fine sandy loam	12	<1%	0–15%	moderate	moderate	—	moderate to severe	—
437	Lithic and Calcic Ustochrepts-fine sandy loam	24	<1%	0–15%	low to moderate	low to moderate	—	moderate to severe	—
439	Typic Haplustalfs-deep cobbly loam	15	<1%	15–40%	moderate	moderate	—	severe	—
453	Vertic and Typic Haplustalfs-deep cobbly clay loam	138	<1%	0–15%	moderate	moderate	—	moderate to severe	—
465	Typic and Vertic Haplustalfs-deep cobbly clay loam	20	<1%	0–15%	low to moderate	low to moderate	—	severe	—
523	Mollic Eutroboralfs-deep very cobbly clay loam	6	<1%	0–15%	low	low	—	severe	—
524	Typic Argiborolls and Mollic Eutroboralfs-moderately deep very stony and cobbly loam	7	<1%	15–40%	high	high	—	severe	—
	TOTAL	95,043	100 %						
Source: NRCS 2008, 2009b; Forest 2001									

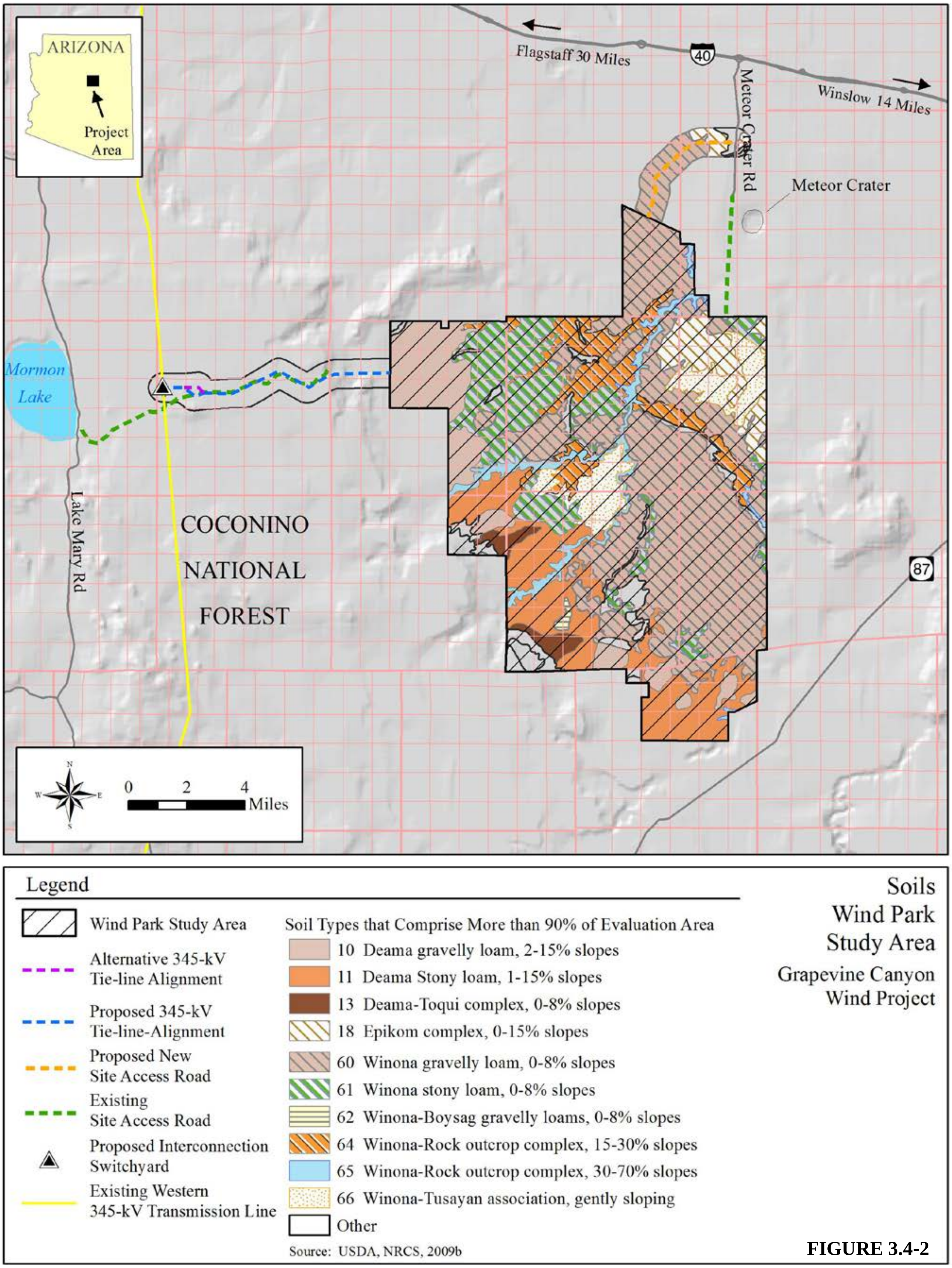

ARIZONA
Project Area
Flagstaff 30 Miles
40
Winslow 14 Miles
Meteor Crater Rd
Meteor Crater
Mormon Lake
Lake Mary Rd
COCONINO NATIONAL FOREST
87
0 2 4 Miles
Legend
Wind Park Study Area
Alternative 345-kV Tie-line Alignment
Proposed 345-kV Tie-line-Alignment
Proposed New Site Access Road
Existing Site Access Road
Proposed Interconnection Switchyard
Existing Western 345-kV Transmission Line
Soil Types that Comprise More than 90% of Evaluation Area
10 Deama gravelly loam, 2-15% slopes
11 Deama Stony loam, 1-15% slopes
13 Deama-Toqui complex, 0-8% slopes
18 Epikom complex, 0-15% slopes
60 Winona gravelly loam, 0-8% slopes
61 Winona stony loam, 0-8% slopes
62 Winona-Boysag gravelly loams, 0-8% slopes
64 Winona-Rock outcrop complex, 15-30% slopes
65 Winona-Rock outcrop complex, 30-70% slopes
66 Winona-Tusayan association, gently sloping
Other
Source: USDA, NRCS, 2009b
Soils
Wind Park Study Area
Grapevine Canyon Wind Project

FIGURE 3.4-2

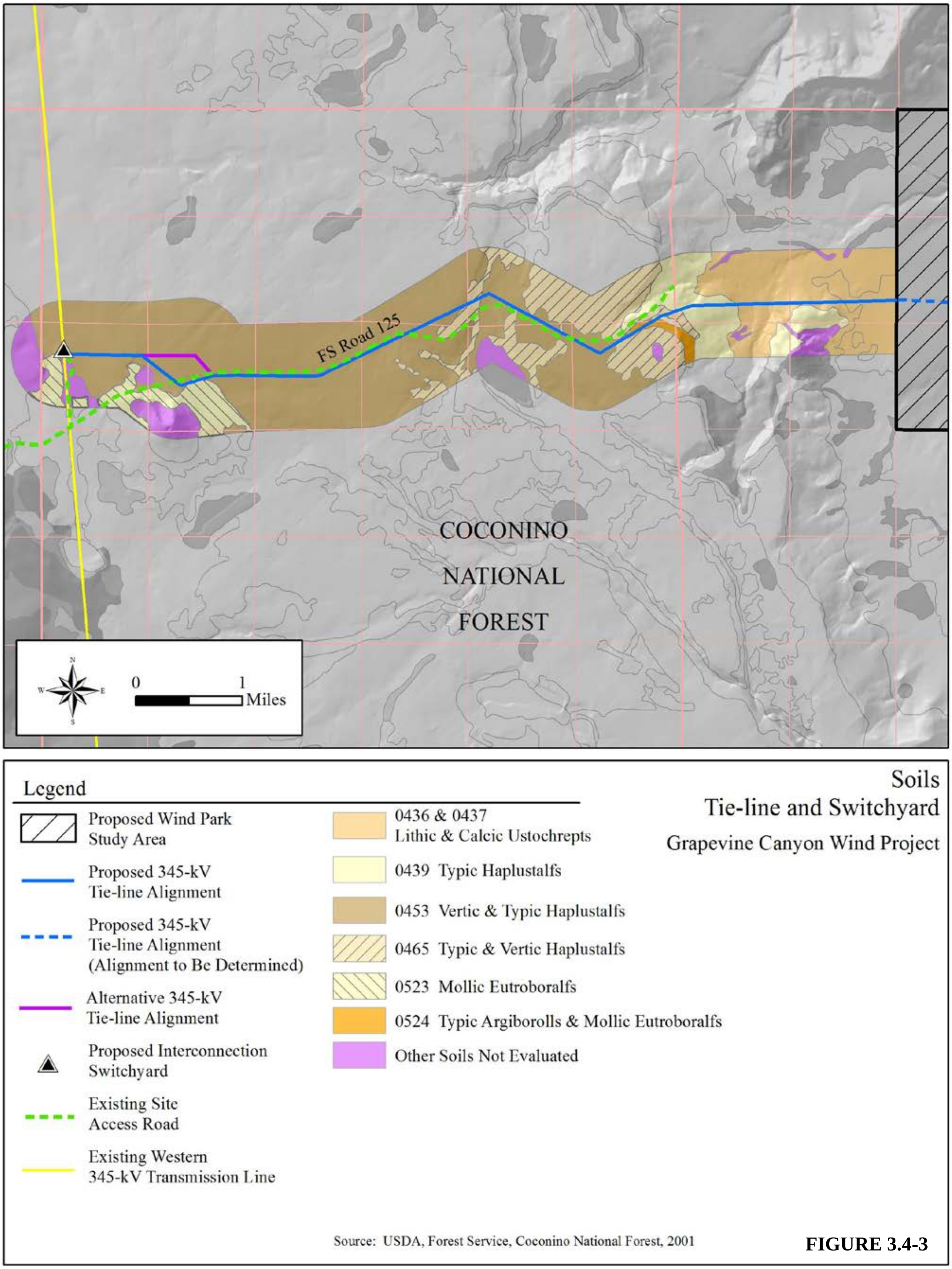

FS Road 125
COCONINO
NATIONAL
FOREST
N
S
W
E
0
1
Miles
Legend
Proposed Wind Park Study Area
Proposed 345-kV Tie-line Alignment
Proposed 345-kV Tie-line Alignment (Alignment to Be Determined)
Alternative 345-kV Tie-line Alignment
Proposed Interconnection Switchyard
Existing Site Access Road
Existing Western 345-kV Transmission Line
0436 & 0437 Lithic & Calcic Ustochrepts
0439 Typic Haplustalfs
0453 Vertic & Typic Haplustalfs
0465 Typic & Vertic Haplustalfs
0523 Mollic Eutroboralfs
0524 Typic Argiborolls & Mollic Eutroboralfs
Other Soils Not Evaluated
Soils
Tie-line and Switchyard
Grapevine Canyon Wind Project
Source: USDA, Forest Service, Coconino National Forest, 2001

FIGURE 3.4-3

3.4.2 Environmental Consequences

This section evaluates the potential impact of the project on geological and soils resources. The primary concern is the potential for ground disturbance or erosion that would reduce the condition or the productivity of soils.

3.4.2.1 Standards of Significance

Impacts to geological and soils resources would be considered significant if any of the following conditions occur:

- Project development would cause appreciable, accelerated soil erosion and loss of productivity or slope failure.
- Soil disturbance, erosion, or compaction would cause long-term, negative impacts to rangeland or wildlife habitat.
- Mineral resources not available elsewhere would be altered or consumed.

3.4.2.2 Foresight's Proposed Project and Proposed Federal Actions

The proposed project would have no effect on prime farmland and/or agriculture or proposed land uses, because neither of these resources exists within the evaluation area.

Wind Park

The proposed wind park would necessarily disturb soil and bedrock resources to establish a primary access road, service roads, collection transmission system, step-up substations, construction staging areas, and WTG foundations. A total of approximately 2,050 to 2,193 acres would be temporarily disturbed leading to approximately 555 to 570 acres of permanently altered grades and soils of which approximately 450 acres would include new service roads (refer to Table 2.2-4).

Measures would be taken to confine vehicle traffic to existing roads per the RPMs outlined in Section 2.7. This would minimize potential soil compaction resulting from project-related travel on public and private roads to reduce the likelihood the proposed wind park would create adverse soil conditions, erosion, or slope failure that would degrade public land or roads. Significance thresholds for geology and soils would not be exceeded.

Over 90 percent of the wind park study area is covered with Deama and Winona soils that have a high potential for runoff and erosion from water once disturbed (refer to Table 3.4-1). Deama soils are gravelly, stony, shallow, loamy soils with 19 to 23 inches to bedrock. They are not susceptible to compaction but are low in rangeland productivity. However, there are several thousand acres of Winona-Tusayan soils (map key 66 in Figure 3.4-2) at the confluence of Grapevine Canyon and Canyon Diablo that are productive for rangeland forage and susceptible to compaction, runoff, and erosion from water. Winona loams (map key 60-62, and 66 in Figure 3.4-2) in general are shallow, productive, and have high potential for runoff and erosion from water. Soil disturbing activities, such as removing the soil protective cover or compacting the natural soil structure, could directly reduce rangeland forage. They also could potentially introduce a cycle of soil loss and introduction of aggressive non-native species that out compete and further reduce desirable forage species.

The proposed wind park would increase soil erosion and decrease soil productivity during the construction phase. The proposed wind park would permanently remove less than one percent of soil and geology resources in the geology and soils evaluation area from other land uses by converting them to access and service roads, crane pads, parking, and foundations. It could contribute to ongoing soil erosion if drainage structures and soil cover were not well maintained at foundation sites and along service roads.

In order to minimize soil erosion, compaction, loss of soil productivity, and the spread of noxious weeds, Foresight has proposed RPMs outlined under Geology and Soils in Table 2.7-1. With application of these measures, soil disturbance, erosion, or compaction would not cause long-term impacts to rangeland or wildlife habitat, and applicable significance thresholds for geology and soils would not be exceeded.

One or more borrow pit locations would be selected during final wind park design so that road base material and aggregate could be sourced and crushed on site. Disturbance for each borrow pit would be two to four acres. Sand and gravel are common resources and their use in the quantities required to complete construction of the proposed wind park and transmission tie-line would not substantially reduce their supply in the area; therefore, no unique mineral resources would be altered or consumed.

Transmission Tie-line

Table 2.2-6 provides estimates of the extent of ground disturbance along the transmission tie-line corridor including Federal, State trust, and private land. The total temporary disturbance is between 345 and 413 acres, with between 196 and 234 acres on Forest Service-managed lands. This estimate of construction disturbance on Forest Service-managed lands includes the construction staging area, transmission tie-line right-of-way, and access roads. Following construction, areas of permanent disturbance would remain at structure foundations and for access and spur roads to foundation pads where needed. Total permanent ground disturbance would be between 19 and 25 acres, with between 11 and 14 acres located on Forest Service-managed lands.

The proposed transmission tie-line right-of-way would require the use of approximately six miles of existing FS 125, FS 9483g, and new spur roads to access individual transmission structures (see Figure 2.2-14). FS 125 does not descend Anderson Mesa, so a new access road would be constructed within the proposed 200-foot right-of-way, adjacent to a drainage that is tributary to Yaeger Canyon. This portion of the transmission tie-line would follow an existing cattle trail west out of the wind park study area to minimize new land disturbance. This new access road would extend approximately 2.5 miles from FS 125 to the Forest Service boundary, then up to approximately 6.5 miles to the step-up substations. The total area of potential ground disturbance for road construction and maintenance would be between 18 and 24 acres with roughly between 10 and 13 acres on Forest Service-managed lands.

Most of the soils along the proposed transmission tie-line are loams that are moderately or highly erodible and have severe limitations for development as unsurfaced roads. On private and State trust lands, Deama and Winona loams have high runoff potential and high hazard for erosion from water (map keys 10, 61 in Figure 3.4-2). There is also a rock outcrop with 15–30 percent slopes located within the proposed right-of-way (map key 64 in Figure 3.4-2). On National Forest System lands, soils are primarily Ustochrepts (map keys 436, 437 in Figure 3.4-3) and Haplustalfs found in the tributary to Yaeger Canyon from Anderson Mesa (map keys 439, 465 in Figure 3.4-3). Both soil types have moderate hazard of erosion and severe limitations for road development. The Haplustalfs soils would compact, pond, and displace if disturbed while wet. Flowing water creates sheet and rill erosion when soil protective materials are removed. These soils resist revegetation due to their high clay content.

Construction of the transmission tie-line would increase soil erosion and reduce soil productivity for a relatively small area. The access roads and structure foundations would permanently remove between 19 and 25 acres of soil and geology resources from other land uses and could contribute to ongoing soil erosion if soil cover and drainage structures were not well maintained. To minimize impacts, RPMs identified in Table 2.7-1 under Geology and Soils would be implemented and impacts to geology and soils as a result of the proposed transmission tie-line would not cause appreciable, accelerated soil erosion and loss of productivity or slope failure nor cause long-term, negative impacts to rangeland or wildlife habitat. Applicable significance thresholds associated with soils would not be exceeded.

Western's Switchyard

A total of 24 acres would be temporarily disturbed by Western during construction of the proposed Switchyard. Switchyard construction would temporarily disturb approximately 20 acres of Forest Service-managed lands and an additional four acres would be temporarily disturbed during the installation of new tie-in dead-end structures on the Glen Canyon-Pinnacle Peak transmission lines leading into the new switchyard. Temporary use areas would be reclaimed prior to operations. The switchyard and staging area would be located on Haplustalf soils which are deep, cobbly clay loams formed on elevated plains (map key 453 in Figure 3.4-3). These soils have a moderate erosion hazard, and maintenance of vegetative groundcover is essential to prevent accelerated sheet and rill erosion and reduce seasonal surface cracking that accelerates drying of the subsoil. The success of revegetation is limited by soils with clayey textures at or near the surface. Haplustalf soils have severe limitations for unsurfaced roads because they are shallow and easily eroded.

The proposed switchyard would result in the permanent conversion of approximately 15 acres of Forest Service-managed lands with productive soils to industrial use. Construction activities would have an additional impact on Forest soils resources beyond those described for the transmission tie-line and access roads due to the nature of the site's soils. RPMs, as outlined in Section 2.7 for the proposed switchyard, would be applied to avoid spreading subsurface soils over, or mixing them with, surface soils. With the application of these RPMs, impacts to geology and soils as a result of the proposed switchyard would be minimized and significance criteria listed in Section 3.4.2.1 would not be exceeded.

3.4.2.3 Alternative Transmission Tie-line Corridor

The alternative transmission tie-line would permanently disturb between 20–26 acres, or one more acre than the proposed transmission tie-line, of which between 12–15 acres would be on Forest Service-managed lands. Although the length of the alternative transmission tie-line is approximately the same as the proposed transmission tie-line, the alternative transmission tie-line alignment requires approximately three-quarters mile more access roads to be constructed because it does not maximize the use of existing roadways. It would require establishing a new corridor within one-half mile of the proposed transmission tie-line which parallels FS 125 and FS 9483g. The alternative transmission tie-line alignment would be located on Haplustalf soils (map key 453 in Figure 3.4-3). These soils have a moderate erosion hazard. Maintaining vegetation, rock fragments, and other soil cover is essential in preventing accelerated erosion. These soils are problematic for revegetation activities due to clayey soils near the surface that shrink in response to dryness. Haplustalf soils are also problematic for developing unsurfaced access roads because they are shallow and erode easily. RPMs, as outlined in Section 2.7, would be applied and impacts to geology and soils would not cause appreciable, accelerated soil erosion and loss of productivity or slope failure nor cause long-term, negative impacts to rangeland or wildlife habitat. Applicable significance thresholds for geology and soils would not be exceeded.

3.4.2.4 No Action Alternative

Geology and soil resources would not be disturbed or otherwise affected under the No Action Alternative. Under this alternative, Western would not approve an interconnection for the Grapevine Canyon Wind Project and the Forest Service would not issue a permit for the transmission tie-line proposed for the wind park. The wind park, transmission tie-line, and switchyard would not be constructed and geology and soils would remain unchanged.

3.5 AIR QUALITY

3.5.1 Affected Environment

3.5.1.1 Resource Evaluation Area

This section addresses ambient regional air quality conditions and discusses potential air quality impacts related to the proposed wind park, transmission tie-line, and Western's switchyard and alternatives. Since there are no Class I airsheds or designated air quality nonattainment areas in the vicinity of the proposed facilities, the air quality evaluation area includes all of Coconino County.

3.5.1.2 Characterization

Climate and meteorological information was gathered from the Western Regional Climate Center (WRCC) and the National Oceanic and Atmospheric Administration (NOAA). Ambient air quality data were collected from the EPA Air Quality Database. Further rules and regulations were gathered from the Arizona Department of Environmental Quality (ADEQ). Meteorological conditions can affect the extent to which air pollutants are dispersed. Winds as reported at the Winslow, Arizona monitoring station are generally from the southwest and average approximately 6.7 miles per hour in December up to 11.7 miles per hour in April. An overview of these and other meteorological conditions is provided in Section 3.6 (Water Resources) of this EIS.

Air Quality Standards and Existing Air Quality

The Clean Air Act (CAA) of 1970, as amended in 1990, required the EPA to develop standards for pollutants considered harmful to public health or the environment. Two types of National Ambient Air Quality Standards (NAAQS) were established (EPA 2008c). Primary standards protect public health, while secondary standards protect public welfare, by including protection against decreased visibility and damage to things such as animals, crops, landscaping and vegetation, or buildings. NAAQS have been established for six "criteria" pollutants:

- Carbon monoxide (CO)
- Nitrogen oxide (NO_x)
- Sulfur dioxide (SO_2)
- Ozone (O_3)
- Particulate matter (PM_{10} and $PM_{2.5}$)
- Lead (Pb)

The CAA uses the Statewide Implementation Plan process, whereby plans are developed by individual States, approved by the EPA, and then implemented by the State. ADEQ is the State agency responsible for ensuring air quality regulation and has adopted the NAAQS for Arizona. Areas are classified as attainment, nonattainment, or unclassified. Attainment is achieved when monitored ambient air quality data is in compliance with the NAAQS for a specified pollutant. Non-compliance with a standard would result in nonattainment designation, and an unclassified designation indicates that insufficient data are available to determine compliance for that pollutant.

The nearest current nonattainment area is associated with the Phoenix metropolitan area located approximately 100 miles from the wind park study area, which is in nonattainment for O_3 and PM_{10}. The nearest air quality monitor to the wind park study area is located in Flagstaff, approximately 23 miles northwest of the western edge of the wind park study area. Monitors in Coconino County only collect information on $PM_{2.5}$, PM_{10}, and O_3, for which monitored levels are below NAAQS. Monitors for other criteria pollutants are not located in Coconino County.

The EPA has developed standards for ambient air concentrations of criteria pollutants. Coconino County is currently within attainment or unclassified status for all criteria pollutants (EPA 2008a).

The CAA includes measures to Prevent Significant Deterioration (PSD) of air quality in areas where air quality is better than the national standards established by the EPA. One of the purposes of the PSD program is "to preserve, protect, and enhance air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special natural, recreational, scenic or historic value." The PSD program divides areas into two classes based on the potential for degradation due to air quality. Class I areas receive heightened protection through more stringent requirements and include some national parks, monuments, and wilderness areas. All other areas are designated as Class II. The wind park study area, proposed transmission tie-line, and Western's switchyard are located within Class II areas. The nearest Class I areas are located in the Sycamore Canyon Wilderness Area approximately 30 miles to the west, and Mazatzal Wilderness Area approximately 40 miles to the south of the wind park study area.

To implement Federal air quality standards, ADEQ evaluates pollutant emissions from various types of facilities and determines if regulatory operating permits are required. Pollutant-specific emissions thresholds are used to determine whether a new Class II Air Quality Permit would be required for an emissions source. Class II General Permits have also been developed for categories of sources, such as rock crushers and concrete batch plants. A source is considered "major" if it has the potential to emit 250 tons per year (tpy) or more of any criteria pollutant from non-fugitive emissions while located in an attainment area. Additionally, a source would be considered major if it would increase ambient pollutant levels by 1 micrometer^3 (μ/m^3) within 10 kilometers of a Class I area.

Hazardous Air Pollutants

The Federal Hazardous Air Pollutants (HAP) program considers a source major if it has the potential to emit at least 10 tpy of a single HAP or 25 tpy of a combination of HAPs. A minor source would emit 1 to 10 tpy of a single or 2.5 to 25 tpy of a combination of HAPs.

Climate Change/Greenhouse Gas

According to the 2009 report, *Global Climate Change Impacts in the United States*, climate-related changes have already been observed and are expected to grow. Rapid rates of warming are anticipated to lead to particularly large impacts on water resources and natural ecosystems. Water supplies are projected to become increasingly scarce while flooding events would become more frequent. Increasing temperature, drought, wildfire, and invasive species would accelerate the transformation of traditional landscapes. Climate change could exacerbate environmental impacts from the proposed project. Recent, rapid warming trends in the Southwest region would affect moisture content in vegetation, reducing forage for cattle and wildlife, and increase wildfire frequency and severity. These conditions would make revegetation of disturbed areas more difficult and impose an additional stress on wildlife.

The Arizona Climate Change Advisory Group (ACCAG), established in 2005, has conducted greenhouse gas (GHG) emissions and projections through 2020. In 2000, electricity production accounted for approximately 40 percent of Arizona's GHG emissions. In 2009, Arizona electric power generation accounted for 53.5 million metric tons of CO_2, the largest component of GHG emissions. As a whole, the industry required 0.48 metric ton of CO_2 per megawatt hour (MWh) of electricity produced. Table 3.5-1 presents DOE data of select GHG emissions in Arizona for the production of electric power in 2009. Projections indicate that if current trends continue, emissions from electricity production would be 75 percent above 2000 levels. The ACCAG developed a climate change action plan with recommendations for reducing GHG emissions in Arizona. The recommendations included mandates and support for renewable energy production.

TABLE 3.5-1 ARIZONA ELECTRIC POWER INDUSTRY GHG EMISSIONS BY ENERGY SOURCE, 2009						
Energy Source	**Generation (Megawatt hours)**	**CO_2 (Metric tons)**	**SO_2 (Metric tons)**	**NO_x (Metric tons)**	**Total Emissions (Metric tons)**	**Metric Tons of Emissions per Megawatt Hour**
All Sources	111,971,250	53,523,638	32,883	61,622	53,618,143	0.4780
Coal	39,706,817	39,202,857	32,786	57,684	39,293,327	0.9873
Natural Gas	34,739,170	14,269,696	73	3,360	14,273,129	0.4108
Other Biomass	21,990	0	0	332	332	0.0000
Wood and Wood Derived Fuels	136,641	0	19	194	213	0.0000
Petroleum	62,699	51,085	5	51	51,141	0.8148
Nuclear	30,661,851					
Hydroelectric Conventional	6,427,345					
Wind	29,545					
Solar Thermal and Photovoltaic	14,145					
Pumped Storage	169,480					
Source: DOE 2009						

On December 7, 2009, the EPA Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

- *Endangerment Finding*: The EPA Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases (i.e., carbon dioxide [CO_2], methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride [SF_6]) in the atmosphere threaten the public health and welfare of current and future generations.
- *Cause or Contribute Finding*: The EPA Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing the EPA's proposed greenhouse gas emission standards for light-duty vehicles, which were jointly proposed by EPA and the U.S. Department of Transportation's National Highway Safety Administration on September 15, 2009 (EPA 2009a).

3.5.2 Environmental Consequences

3.5.2.1 Standards of Significance

Air quality impacts would be considered significant if any of the following conditions were met:

- Emissions generated by construction or operation of the project components would violate any air quality standards.

- Emissions would compromise the attainment status of the area.
- Emissions would cause the significant deterioration of a Class I airshed.
- Project implementation would result in a long-term HAP major source.

Air quality impacts would be greatest during the construction period with fugitive dust emissions primarily from earthmoving and construction vehicle exhaust emission. In addition, there are fugitive and point sources associated with the concrete batch plant (ERM 2011). Operational impacts would be restricted to dust and internal combustion engine emissions due to periodic maintenance vehicle traffic because WTGs do not have emissions.

3.5.2.2 Foresight's Proposed Project and Proposed Federal Actions

This section discusses potential air quality impacts from emissions of pollutants during construction and operation of the proposed wind park, transmission tie-line, and switchyard. Direct impacts could be associated with construction, operation, and maintenance of project components, including WTGs, met towers, new access roads, collection lines, step-up substations, rock crusher, concrete batch plant, O&M facility, transmission tie-line, and Western's proposed switchyard. Air quality impacts beyond the immediate study area are not predicted, because vehicular dust generation and pollutants from combustion engines are relatively localized at the point of origin and are not permanent.

Table 3.5-2 presents estimated emissions of criteria pollutants at the project site for up to 18 months of construction activities. The specific schedules for each portion of the construction, the affected or disturbed areas, and the roster of vehicles planned, were developed from the information presented in Chapter 2. Total construction emissions are estimated at 210 tons, with PM emissions totaling 93 tons and NO_x 51 tons. Actual construction phase emissions are expected to be significantly below the estimated levels shown in the table (ERM 2011).

TABLE 3.5-2
ESTIMATED PROJECT CRITERIA POLLUTANT EMISSIONS

Emission Source Category	Total Project Construction (tons)[1]				
	PM_{10}	**PM**	**NO_X**	**CO**	**VOC**
Wind Park, Roadways, and Other Construction Activities (500 MW Plant)					
Earthmoving and Vehicles – site prep and road construction[2]	1.65	2.48	11.0	4.3	1.2
Construction Activities – borrow pit/ concrete plant[2]	1.74	1.83	8.6	6.2	1.8
Construction Vehicles – wind park	2.49	2.49	31.3	11.2	3.3
Earthmoving and Construction Activities – transmission tie-line[2]	0.16	0.31	included in wind park		
Borrow Pit and Crushing Plant Operation[3]	1.56	3.14	–	–	–
Concrete Batch Plant Operation[3]	30.5	82.9	–	–	–
Total Construction Emissions	38.1	93.1	50.9	21.7	6.3

Source: ERM 2011

[1]Calculations based on roster of equipment and activity on-site based on the Project Description in Section 2.
[2]Earthmoving activity estimates assume 37 acres of plant site, 4 acres borrow pits, and 7 acres of the linear transmission corridors would be under active construction in a single day. Emission factors used for general heavy industry construction activity from URBEMIS Version 9.2.4 of 20 lbs PM_{10}/acre-day.
[3]Aggregate and concrete batch plant emission factors for fugitive and controlled point sources from U.S. EPA Document AP-42, Chapter 11. The inclusion of an on-site batch plant is included in the proposed project.

Construction

Construction emissions can vary substantially from day-to-day depending on the level of activity, the specific operations, and the prevailing meteorological conditions (ERM 2011). Air quality impacts from construction activities would be temporary and limited to the construction period. These temporary impacts would include fugitive dust, vehicle and equipment emissions, and operation of the concrete batch plant and rock crusher.

Fugitive Dust

Construction activities would produce fugitive dust from the following general operations:

- Construction-related traffic on unpaved site roads.
- Ground disturbance from clearing and grading activities.
- Excavation activities, including blasting if required, for on-site borrow pits, WTG foundations, transmission tie-line foundations, and substation equipment foundations.
- Rock crusher and concrete batch plant operations.

Approximately 90 tons of fugitive dust can be expected to be released as a result of wind park construction activities (Table 3.5-2). Dust control measures that provide practical and reasonable control at construction sites are listed in Table 2.7-1 under Air Quality. These RPMs as proposed by Foresight for construction of the proposed wind park and portions of the transmission tie-line on private and State trust lands, by the Forest Service for portions of the transmission tie-line that crosses Forest Service-managed lands and the proposed switchyard, and by Western for construction of the proposed switchyard. With implementation of the RPMs, construction activities would not violate air quality standards or exceed air quality significance thresholds.

Vehicle and Equipment Emissions

Vehicles are considered a mobile emissions source and are not regulated or subject to air quality permit requirements. Construction activities would cause vehicle emissions from the following sources:

- Exhaust from the diesel construction equipment used for site preparation, grading, excavation, and construction of wind park structures, transmission tie-line, and switchyard.
- Exhaust from diesel trucks used to deliver equipment, fuel, and construction supplies to the construction sites.
- Exhaust from vehicles used to transport water, rock, top soil, and concrete.
- Exhaust from water trucks used to control construction dust emissions.
- Exhaust from vehicles used to transport workers and materials to and from and around the construction site.
- Exhaust from various other equipment, including diesel-powered welding machines, electric generators, air compressors.

For construction vehicles and equipment, industry practices to reduce tailpipe emissions include the use of diesel engines that meet current EPA emission performance standards for engines between 100 and 750 horsepower. Table 3.5-2 assumes the use of construction vehicles and equipment that are compliant with EPA Tier 2 and estimates gaseous pollutant emission factors based on this level of performance. Another best practice for reducing tailpipe emissions is the use of ultra-low sulfur diesel fuels for all equipment for which such fuel is technically feasible. This practice substantially reduces emissions of both SO_2 and PM (ERM 2011).

RPMs have been proposed by Foresight for vehicle and equipment use during construction of the proposed wind park and portions of the transmission tie-line on private and State trust lands, by the Forest Service for portions of the transmission tie-line that crosses Forest Service-managed lands and the proposed switchyard, and by Western for vehicle and equipment use during construction of the proposed switchyard (see Table 2.7-1 under Air Quality). With implementation of the RPMs, vehicle and equipment use during construction would not violate air quality standards or lead to significant impacts. No additional mitigation would be required to minimize vehicle use air impacts.

Concrete Batch Plant and Rock Crusher

Temporary equipment at the proposed wind park would include a portable concrete batch plant and a portable rock crusher which would avoid the shipping of concrete and aggregate to the project site. Native rock would be quarried within two-acre borrow pit(s) and loaded into the rock crusher by front-end loader(s). From the crusher, the material would pass through a screening plant and be stockpiled for use. The portable batch plant would blend and load approximately 120 tons of concrete per hour. Ready-mix concrete would be required for foundations for the WTG structures, O&M building, transmission tie-line structures, and other facilities. The batch plant would be in operation during road building and foundation construction phases, approximately six to eight months, for approximately 10 to 12 hours per day, up to six to seven days per week. It is assumed that both the batch plant and rock crusher would use diesel-powered generators during operations.

Operation of the batch plant and rock crusher would emit approximately 118 tons per year of criteria pollutants and would not require a major source permit. Dust control systems would be in place and maintained in good operating condition during all periods of crusher and batch plant operation. Emissions controls for stationary processing equipment would include cyclones, fabric filters, and enclosures for the crusher chute, discharge belt, and other transfer points. In addition, water sprays, physical enclosures, or other palliative treatments would be applied as needed near all emissions, transfer, and loading points along the mixing and crushing circuits to control dust. The movement of heavy trucks over unpaved or dusty surfaces in and around these on-site plants would be controlled by good maintenance, wetting of the road surface with water, and/or the use of dust suppressants.

As described in Table 1.3-1, operation of the rock crusher and concrete batch plants would require a minor source permit from ADEQ. The construction contractor would obtain authorization to operate under the general permits available for these facilities and would comply with all terms and conditions of the permit(s). As a result of the temporary use of these facilities, the dust suppression activities and the BMPs associated with the necessary permits, air quality impacts from the concrete batch plant and rock crusher would not violate air quality standards. Applicable air quality significance thresholds listed in Section 3.5.2.1 would not be exceeded.

A material and concrete source for Western’s proposed switchyard has not been identified. Typically, the construction contractor selected by Western to construct a switchyard would be responsible for securing material and concrete for the construction. Western would require that any new sources be reviewed and cleared for use in accordance with regulatory requirements before authorizing materials for construction.

<u>Operation</u>

Impacts to air quality as a result of operation of the proposed wind park, transmission tie-line, and switchyard are expected to be negligible (BLM 2005). The proposed WTGs and transmission tie-line would produce no air emissions, because no fuel would be burned to produce energy. Other facilities such as the O&M building would use electricity or propane to heat and cool the structure, producing some air emissions on an intermittent basis. Operation of the wind park would have a net benefit to air quality, as wind energy produces no air emissions, substantially less than other energy generation sources such as a coal fired power plants which would average 2,249 lbs (1.02 metric ton) of CO_2 (the most commonly measured greenhouse gas) per megawatt hour produced. The proposed project could displace a small amount of CO_2 emissions, between 205 and 495 metric tons during annual operations (DOE 2009).

Operational traffic is expected to consist mainly of commuter vehicles and pickup trucks traveling between the WTGs, O&M facility, and transmission tie-line structures for inspection and maintenance. Routine maintenance activities would include road maintenance and lubricant changing, which could generate emissions related to combustion from vehicle travel, fugitive dust, and small amounts of volatile organic compounds (VOC) during periodic lubricant replacement. Major maintenance activities could include replacement or repair of major wind park components. This could require the operation of heavy machinery, depending on the specific activity required. Impacts would be temporary and limited to combustion from equipment and fugitive dust from road travel and potential earth moving activities. Routine and major maintenance activities are temporary and site specific, so only minimal impacts would be expected. Therefore, operation of the wind park would not negatively impact air quality.

Western's proposed switchyard and the proposed step-up substations could include sulfur hexaflouride (SF_6) gas-filled circuit breakers. Sulfur hexafluoride is another GHG listed in EPA's endangerment finding. Since 2000, Western has had an aggressive program to identify and repair leaks throughout the transmission system to reduce SF_6 emissions. Western personnel would monitor the use, storage, and replacement of SF_6 to minimize any releases to the environment. The likelihood for accidental release is low, as SF_6 gas is supplied in sealed units and is factory-certified not to leak. During operation of the new switchyard, authorized Western personnel would conduct periodic inspections and service equipment as needed. Properly trained maintenance personnel would monitor and manage the use, storage, and replacement of SF_6 to minimize any releases to the environment. During inspections, equipment would be monitored for detection of leaks, and repairs would be made as appropriate.

Western's proposed switchyard would include a backup generator. The size of the backup generator would be determined during the design phase for the switchyard, but it is expected to be under 325 horsepower and exempt from ADEQ permitting requirements (ADEQ 2009a). The generator would be used during periodic testing and in the event of a power outage at the switchyard, since station service would be provided through a proposed station service transformer. The generator's engine would cause periodic air emissions, but below any thresholds that would violate air quality standards.

3.5.2.3 Alternative Transmission Tie-line Corridor

Air quality impacts associated with construction and operation of the alternative transmission tie-line would be similar to those described for Foresight's Proposed Project. The alternative would have slightly more (approximately one acre) permanent ground disturbance from the construction of an additional mile of access road resulting in an incremental increase in fugitive dust and vehicle emissions.

3.5.2.4 No Action Alternative

No short or long term air quality impacts would result through implementation of the No Action Alternative. Under this alternative, Western would not approve an interconnection for the Grapevine Canyon Wind Project and the Forest Service would not issue a permit for the transmission tie-line proposed for the wind park. The wind park, transmission tie-line, and switchyard would not be constructed, and the air quality of the area would remain unchanged.

3.6 WATER RESOURCES

3.6.1 Affected Environment

3.6.1.1 Resource Evaluation Area

The water resources evaluation area for this analysis extends one mile beyond the boundaries of the wind park study area, the transmission tie-line right-of-way, and the proposed switchyard. Drainages and aquifers were surveyed for downstream conditions in order to understand the potential for indirect project impacts. Maps, data, and publications about local water resources were gathered from websites maintained by ADEQ, Arizona Department of Water Resources (ADWR), University of Arizona, USFWS, EPA and NOAA. These were reviewed for information pertinent to evaluating the potential impacts on water resources from the proposed project components. Additional unpublished data was reviewed, including a preliminary determination of jurisdictional wetlands and waters developed from field visits and review of aerial photographs, USGS topographic quadrangle maps, National Wetland Inventory maps, and the National Hydrology Dataset (Atwell 2011).

3.6.1.2 Characterization

Climate

The water resources evaluation area is located in the Plateau Uplands Hydrogeologic Province of Arizona, which is a high desert plateau region where landforms are dominated by deeply incised canyons, high isolated mesas and buttes, and volcanic peaks (Cooley 1963; Montgomery and Harshbarger 1989). While much of the water resources evaluation area is semi-arid, portions closer to the Mogollon Rim receive higher amounts of rainfall. Annual precipitation averages between 10 and 18 inches (ADWR 2009a). Precipitation is variable year to year, and decadal swings of 10 to 20 years between drought and wet conditions are typical (ADWR 2009a). The driest months are April, May, and June and most moisture occurs in July and August (WRCC 2009a). Table 3.6-1 depicts typical monthly weather conditions 20 miles from the project site in Winslow, Arizona.

TABLE 3.6-1
HISTORICAL CLIMATE STATISTICS FOR WINSLOW, ARIZONA

Month	Daily Max Temp[1]	Daily Min Temp[1]	Normal Precip[2]	Max Snow, Ice, Hail[2]/Year of Occurrence	Wind Information		
					Mean Speed[3]	Predominant Direction	Fastest Mile[3]/ Year
January	45	19	0.5	11.3/1987	7.1	ESE	56/1951
February	53	25	0.5	10.7/1973	8.5	SW	63/1971
March	61	30	0.6	11.0/1973	10.6	SW	58/1975
April	70	37	0.3	4.8/1977	11.3	SW	56/1957
May	80	45	0.3	0.6/1978	10.9	SW	53/1950
June	91	54	0.3	0	10.6	SW	52/1953
July	94	63	1.2	0	9.0	SW	59/1954
August	91	61	1.4	0	8.4	ESE	43/1966
September	84	53	0.9	T/1945	8.2	SW	40/1950
October	72	40	0.9	8.2/1961	7.6	ESE	49/1970
November	58	29	0.6	7.4/1952	7.3	SE	46/1964
December	46	20	0.6	39.6/1967	6.7	SE	52/1966
Year	70	40	8.0	39.6/1967	8.8	SW	63/1971

[1]degrees Fahrenheit; [2]inches; [3]miles per hour
Source: Western Regional Climate Center 2009a

Most of the annual precipitation in Arizona occurs in late summer and mid-winter. Precipitation is provided by winter storms of the Pacific Ocean system and annual summer monsoon storm systems originating in the southern Pacific Ocean and the Gulf of Mexico (Jones 1993). Late summer monsoons provide intense rainstorms, generally of relatively short duration. Winter precipitation includes longer duration rains and snowfall. Losses of rainfall and snow to evapotranspiration and sublimation are high in the region.

Temperatures in Arizona have risen since the mid-1970s. Since 1976, the average annual temperature increased by 2.5 degrees Fahrenheit (F). Going forward, average annual temperature in the Southwest is projected to rise by five to eight degrees F by the end of the century (Lenart 2007).

Groundwater

The water resources evaluation area lies over the Little Colorado River Plateau Groundwater Basin. The basin is comprised of consolidated crystalline and sedimentary rocks and three regional aquifers. The shallowest aquifer, the Coconino Sandstone, which is part of the C-aquifer system, is beneath the project site. The C-aquifer generally extends from the Mogollon Rim in the south, northeast into New Mexico, and west beyond the Little Colorado River. Groundwater in the aquifer generally flows north and west from a primary recharge area along the Mogollon Rim and Defiance Plateau.

The regional aquifers are relatively deep (generally several 100 feet to more than 1,000 feet below land surface) and occur in sandstone and limestone units that are gently folded and exhibit relatively shallow regional dips. Groundwater movement in these aquifers occurs chiefly via fracture zones which are most abundant along major fault systems (Montgomery et al. 2000). The land surface over most of the study area consists of fractured limestone which provides for rapid infiltration of precipitation and results in meager surface water runoff (Montgomery and Harshbarger 1989). As a result, the Plateau Uplands Province has a small number of perennial streams and rivers. The principal source of groundwater recharge in the water resources evaluation area is infiltration of precipitation in areas of higher topographic altitude and abundant fracturing of the aquifers and overlying rocks, such as along the Mogollon Rim to the south and Anderson Mesa to the west. Summer precipitation is believed to provide limited groundwater recharge due to high rates of evapotranspiration. Winter rains and snowmelt provide most of the groundwater recharge to the aquifers in the area (Montgomery and Associates 2005).

Saturated thickness of the C-aquifer is about 1,000 feet in the Lake Mary well field (the primary water source for the City of Flagstaff) northwest of the evaluation area (Montgomery and Associates 1993) and about 600 feet along the Little Colorado River Valley north of the evaluation area (Bills et al. 2007). Saturated thickness decreases to the northwest as groundwater in the C-aquifer gradually drains to deeper aquifers; the C-aquifer is completely drained in the Cameron area. The major discharge from the Little Colorado River Plateau Groundwater Basin is at Blue Springs along the lower Little Colorado River. While an estimated 413 million acre-feet of water is stored in the C-aquifer, recharge rates are estimated to be 319,000 acre-feet per year (ADWR 2009a).

Local aquifers in the water resources evaluation area are important sources for smaller water supplies. These may occur in alluvial deposits along washes and stream channels (ADWR 2009a) and in small, thin, and discontinuous perched groundwater zones in the Toroweap and Kaibab Formations. Municipal, industrial, and agricultural activities withdrew around 105,000 acre-feet from the groundwater basin annually from 2001 to 2005 (ADWR 2009a).

A records inventory for 20 registered wells within or in the immediate vicinity of the water resources evaluation area is given in Table 3.6-2. All of these wells are associated with the ranch lands to the east of Anderson Mesa; no wells were identified within one mile of the transmission tie-line alignment on

National Forest System lands. Well locations are shown on Figure 3.6-1. Water levels in the C-aquifer where it is penetrated by wells in the Flying M Ranch area are between 500 and 1,000 feet below land surface. Reported well yields range from 5 to 50 gallons per minute (gpm). Most of the groundwater use is for stock and domestic purposes. AGFD, ASLD, and the Hopi Tribe have registered drill holes in the area (ADWR 2009b). Inspection of sparse hydrograph data for wells in the evaluation area indicate that groundwater levels have raised tens of feet during the past several decades (Montgomery and Associates 2005). Table 3.6-2 identifies six wells owned by Flying M Ranch, four of which have been identified as potential production wells for construction.

TABLE 3.6-2
SUMMARY OF RECORDS FOR REGISTERED WELLS
IN THE WATER RESOURCES EVALUATION AREA

ADWR Reg No./Local Identifier	Well Use	Water Use	Install Date	Well Depth (ft, bls)[1]	Water Level at Time of Install (ft, bls)[1]	Casing Depth (ft, bls)[1]	Casing Diameter (inches)	Pump Rate (gpm)[2]	Tested Rate (gpm)[2]	Draw Down (ft)	Owner[3]
55-631362/ A16012009BBB	Water production (exempt)	Stock	1930	1,000	946	8	8	15	15	—	BT
55-208785/ A16012012DAA	Monitor	Monitoring	—	—	—	—	—	—	—	—	SR
55-208786/ A16012012DAA	Monitor	Monitoring	2005	42	9	37	4	—	—	—	SR
55-649925/ A16012014ABB	Water production (exempt)	Irrigation, stock, domestic	—	600	560	—	8	35	35	—	HE
55-646325/ A17012005DAA	Water production (exempt)	Stock, domestic	1947	940	850	20	10	5	5	—	FM*
55-547017/ A17012029ADA	Water production (exempt)	Stock	—	930	—	20	8	—	—	—	FM*
55-606821/ A17013007CBA	Water production (exempt)	Stock	1971	800	760	40	8	12	—	—	HT
55-509618/ A18012007CCD	Water production (exempt)	Stock	1985	1,045	960	20	0	25	25	20	FM*
55-509619/ A18012009ADB	Water production (exempt)	Stock	1985	790	670	20	0	25	25	40	FM*
55-631371/ A18012013BBD	Water production (exempt)	Stock	1930	900	680	12	8	15	15	—	CT
55-509620/ A18012019CCB	Water production (exempt)	Stock	1985	1,010	910	20	0	25	25	30	FM*
55-509617/ A18012021CDA	Water production (exempt)	Stock	1985	900	810	20	0	25	25	30	FM*
55-631359/ A18012535DAD	Water production (exempt)	Stock, domestic	1945	680	590	12	8	15	15	—	CT
55-509228/ A18013018000	Mineral exploration	None	—	—	—	—	—	—	—	—	RM

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55-560612/ A19011035ADD	Water production (non-exempt)	Irrigation, stock	1997	1,140	1,000	1140	10	40	30	60	AZ
55-522224/ A19012027BAC	Abandoned	Stock	1988	370	—	—	—	—	—	—	AZ
55-522652/ A19012027BAC	Water production (non-exempt)	Stock	1988	776	590	776	6	42	50	60	AZ
55-628232/ A19012029CD0	Water production (exempt)	Irrigation, stock	1945	753	710	753	9	13	13	—	AZ
55-631852/ A19012513BAD	Water production (exempt)	Stock, domestic	1949	690	610	690	5	28	28	—	MG
55-631374/ A19012515CBB	Water production (exempt)	Stock	1950	760	531	12	8	15	15	—	CT

Source: ADWR 2009b
[1] feet below land surface
[2] gallons per minute
[3] AZ=Arizona Game and Fish Department; BT=Bar T Ranch, Inc.; CT=Chilson Family Trust; FM=Flying M Ranch, Ltd.; HE=Hasten and Eckles; HT=Hopi Tribe; MC=Meteor Crater; RM=Rocky Mountain Energy; SR=Salt River Maricopa Indian Community.
– not available
* Flying M Ranch Well

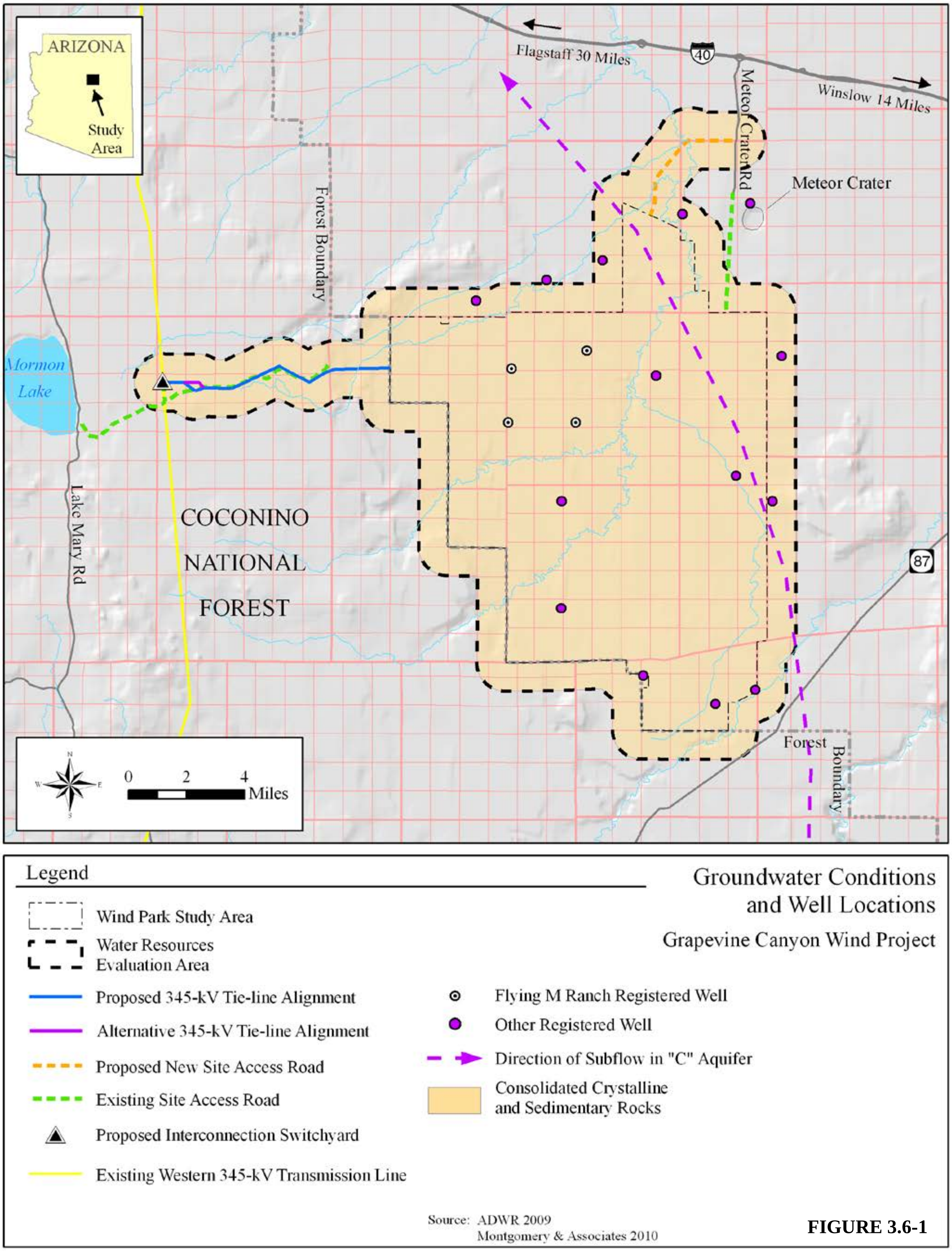

ARIZONA
Study Area
Flagstaff 30 Miles
40
Winslow 14 Miles
Meteor Crater Rd
Meteor Crater
Forest Boundary
Mormon Lake
Lake Mary Rd
COCONINO
NATIONAL
FOREST
87
Forest Boundary
0 2 4 Miles
Legend
Wind Park Study Area
Water Resources Evaluation Area
Proposed 345-kV Tie-line Alignment
Alternative 345-kV Tie-line Alignment
Proposed New Site Access Road
Existing Site Access Road
Proposed Interconnection Switchyard
Existing Western 345-kV Transmission Line
Flying M Ranch Registered Well
Other Registered Well
Direction of Subflow in "C" Aquifer
Consolidated Crystalline and Sedimentary Rocks
Groundwater Conditions and Well Locations
Grapevine Canyon Wind Project
Source: ADWR 2009
Montgomery & Associates 2010

FIGURE 3.6-1

Surface Water

The water resources evaluation area is located within the Little Colorado River watershed. The initial phase of the wind park study area is mostly comprised of upland topographic depressions and small tributary headwaters that do not have frequent flows (Atwell 2011). There are no perennial steams or riparian areas associated with intermittent streams within the water resources evaluation area. In addition, no springs or seeps were identified within the water resources evaluation area. The primary drainage is Canyon Diablo (USGS hydrological unit 15020015) and its tributary, Grapevine Canyon, that send accumulated flow approximately 33 miles to the Little Colorado River. The two ephemeral streams associated with these features drain a large portion of the wind park study area from the southwest to northeast. Yaeger Canyon, also ephemeral, drains the northwest corner of the wind park study area. The southern portions of the wind park study area drain toward Jack's Canyon, an intermittent stream just beyond the wind park study area boundary. See Section 3.2.1.2 regarding riparian areas that may be associated with the canyons. Numerous other named and unnamed ephemeral streams and drainages are found within the wind park study area, generally flowing only during storm events and for short periods of time.

Unnamed ephemeral drainages are also located along the proposed transmission tie-line corridor on National Forest System lands. These drainages are typically small in size and are not deeply incised. These features are not riparian in character as they only have water during storm events for short periods of time. No springs or seeps were identified within the tie-line corridor.

The largest body of water in the water resources evaluation area is the 88-acre Yaeger Lake located at the top of Yaeger Canyon on the Forest. The proposed transmission tie-line would pass within one-quarter mile of the lake. Other earthen catchment structures are an acre or less in size (USFWS 2009a). Artificial surface water catchments, or stock tanks, are numerous within the wind park study area; there are over 36 tanks for watering livestock (ADWR 2009b). However, farm and stock ponds are not generally protected under the Clean Water Act (EPA 2011). In total, surface water diversions consumed 51,000 acre-feet annually from 2001 to 2005 (ADWR 2009a). Figure 3.6-2 depicts the water resources evaluation area's surface water conditions.

The drainages within the water resources evaluation area are part of a very rural and sparsely settled landscape. They have not been studied for flooding hazards by the Federal Emergency Management Agency (FEMA) and are, therefore, described as "areas of undetermined, but possible, flood hazard" (Aber 2009). No impaired surface waters have been identified in the water resources evaluation area, although several reservoirs to the west beyond the water resources evaluation area were added to the statewide list of impaired waters because fish tested positive for mercury (ADEQ 2009b).

Wetlands and Waters of the United States

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) has authority to regulate the discharge of dredged and fill material into waters of the U.S. Waters of the U.S. include non-navigable tributaries that typically flow year-round or have flow at least seasonally (e.g., typically three months).

Wetlands, which are special aquatic sites, can be jurisdictional under Section 404 as a subset of waters of the U.S. Wetlands, as defined by the EPA and the USACE in the Wetland Delineation Manual (U.S. Department of Army, Corps of Engineers, Environmental Laboratory 1987), are "those areas that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." However, field review of the water resources evaluation area and a review of National Wetlands Inventory maps did not identify wetlands or special aquatic areas. Furthermore, wetlands under the jurisdiction of USACE were not found during additional field review of the initial phase of the wind park (Atwell 2011).

However, field review did inventory potential jurisdictional waters within limits of the project study area (Table 3.6-3 and Figure 3.6-3). A preliminary Jurisdictional Determination has been prepared for the initial phase study area for review and determination by the USACE (Atwell 2011). The balance of the wind park study area was evaluated based on field observation to be assembled into presentation for future phase(s) of wind park development at a later date. The wind park study area comprises 262 miles or 253 acres of washes that are potentially under the jurisdiction of USACE (Atwell 2011).

TABLE 3.6-3
ESTIMATED EXTENT OF JURISIDICTIONAL WATERS,* UP-TO-500MW PROJECT STUDY AREA

Project Area	**Stream Miles of Potential Jurisdictional Waters**	**Approximate Acres of Potential Jurisdictional Waters**
Wind Park	261.3	252.9
Tie-Line	0.2	0.1
Site Access Road	0.4	0.4
Switchyard	0.0	0,0
Total	261.9	253.4

Source: Atwell 2011
*Actual jurisdictional waters are subject to the review and determination by USACE.

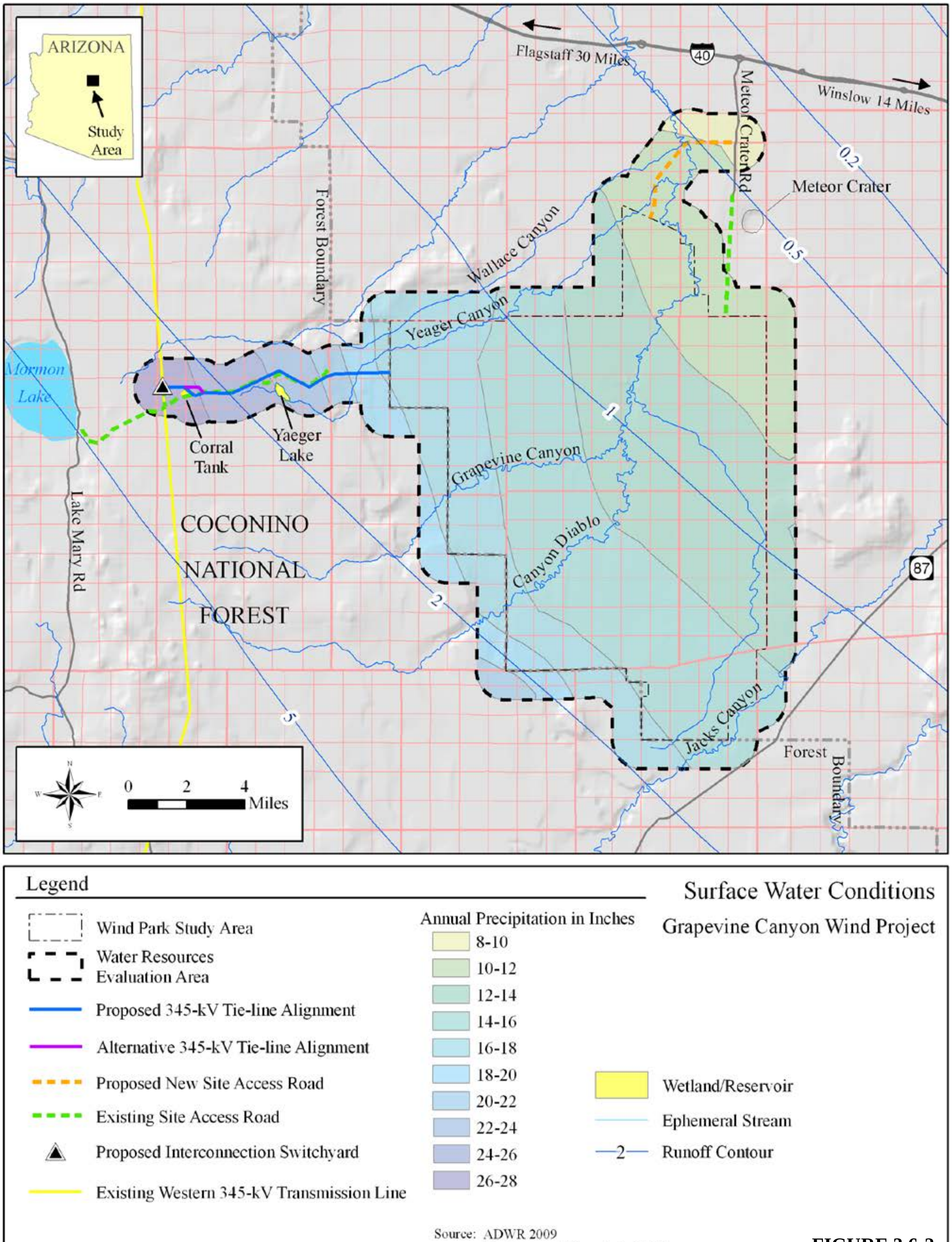
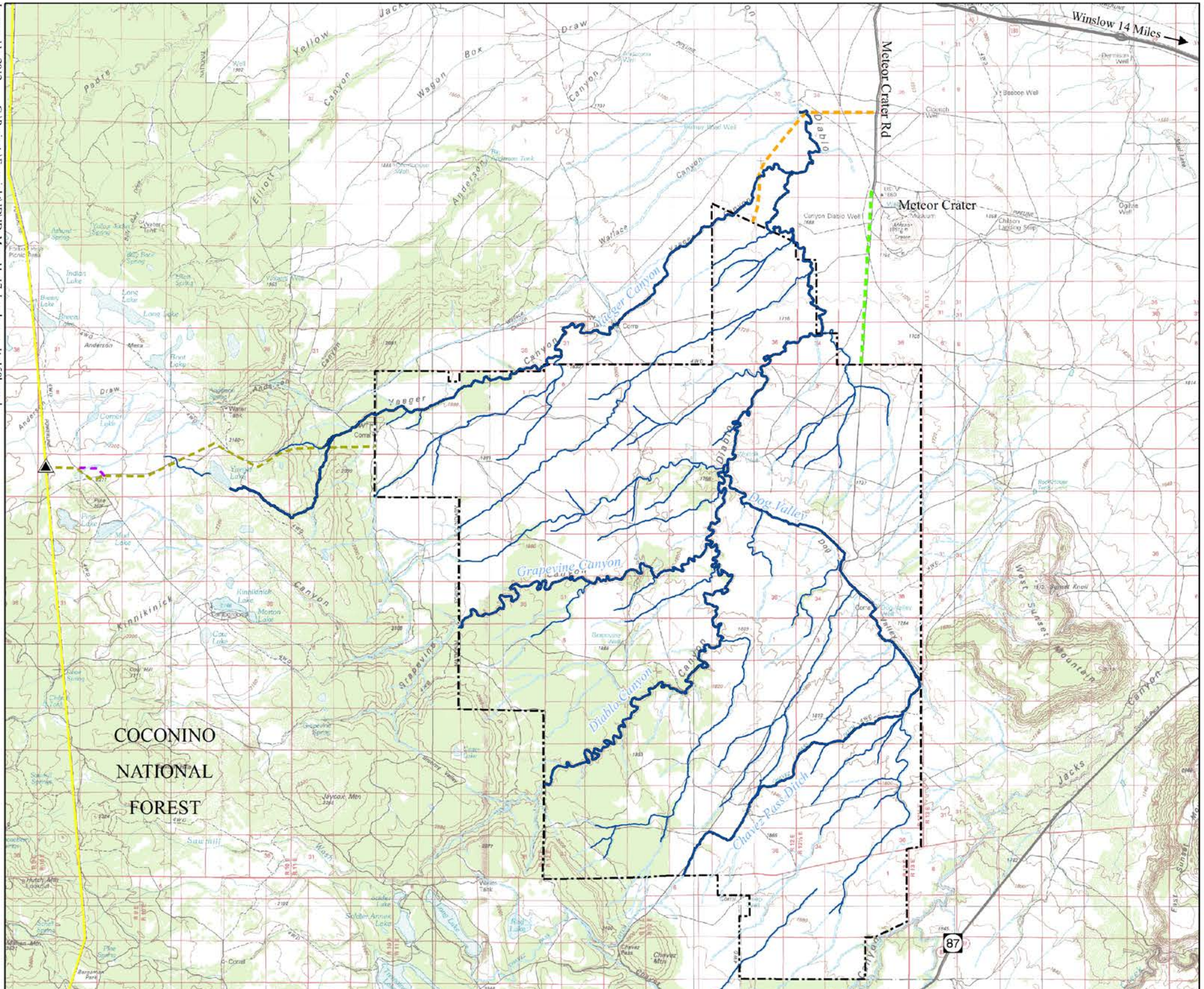

ARIZONA
Study Area
Flagstaff 30 Miles
40
Winslow 14 Miles
Meteor Crater Rd
Meteor Crater
0.2
0.5
1
2
5
Forest Boundary
Wallace Canyon
Yeager Canyon
Mormon Lake
Corral Tank
Yaeger Lake
Grapevine Canyon
Canyon Diablo
Jacks Canyon
Lake Mary Rd
COCONINO NATIONAL FOREST
87
Forest Boundary
0 2 4 Miles
Legend
Wind Park Study Area
Water Resources Evaluation Area
Proposed 345-kV Tie-line Alignment
Alternative 345-kV Tie-line Alignment
Proposed New Site Access Road
Existing Site Access Road
Proposed Interconnection Switchyard
Existing Western 345-kV Transmission Line
Annual Precipitation in Inches
8-10
10-12
12-14
14-16
16-18
18-20
20-22
22-24
24-26
26-28
Wetland/Reservoir
Ephemeral Stream
2 Runoff Contour
Surface Water Conditions
Grapevine Canyon Wind Project
Source: ADWR 2009
Montgomery & Associates 2010

FIGURE 3.6-2

January 11, 2012 G:\Projects\Foresight\JD\JD_Map_11x17_Landscape_1to150k.mxd



Potential Jurisdictional Waters

Grapevine Canyon Wind Project

Legend

- Wind Park Study Area
- Alternative 345-kV Transmission Tie-Line
- Proposed 345-kV Transmission Tie-Line
- Proposed Access Road
- Existing Site Access Road
- Proposed Interconnection Switchyard
- Existing Western 345-kV Transmission Lines
- Projected Jurisdictional Feature
- Upland Feature (no jurisdictional implication)

Note:
The projected jurisdictional waters are based on field observations, assessments of aerial and topographic maps, and supporting document review. The features identified and project area are subject to evaluation by the United States Army Corps of Engineers.

0 1 2 Miles

FIGURE 3.6-3

The Forest Service has identified and inventoried wetlands on Forest Service-managed lands. In addition to Yaeger Lake, the Forest Service identified a second wetland within one mile of the proposed tie-line and switchyard. It is Corral Tank, an 11-acre seasonal water tank, located immediately north of FS 125 near Pine Hill.

3.6.2 Environmental Consequences

This section evaluates the proposed project components' potential impact on both limited surface water resources and on groundwater resources. Potential impacts to groundwater resources were evaluated by compiling a well inventory from ADWR records, reviewing pumping test results for the Lake Mary well field, and using data for the proposed water production wells to estimate water level drawdown impacts on the aquifer and the nearest wells of record. Potential impacts to jurisdictional waters were evaluated by compiling an inventory of drainages and conducting an assessment of the presence or absence of features such as defined bed and banks that are associated with an ordinary high water mark.

3.6.2.1 Standards of Significance

The proposed project components and alternatives would have significant adverse effect on water resources if they:

- Substantially degrade or contaminate surface water quality.
- Substantially deplete groundwater resources, including interfering with groundwater recharge.
- Cause a violation of the terms and conditions of a Federal, State, or local permit, including the loss or degradation of wetlands in violation of a USACE permit.
- Alter surface drainage patterns or stream channel morphology to the extent that vegetation communities and habitats are degraded or productivity is reduced for current resident species.
- Substantially alter the normal flow of a water body or normal drainage patterns and runoff or impede or redirect flood flows from the placement of a proposed project component within a 100-year flood hazard area.

3.6.2.2 Foresight's Proposed Project and Proposed Federal Actions

Foresight estimates that up to approximately 100 million gallons (307 acre-feet) of water would be required for constructing the proposed transmission tie-line and wind park, if fully built out to 500 MW. A concrete batch plant would consume 27–54 million gallons (83–166 acre-feet) of the total with the remainder used for dust abatement (watering the roads, rock crusher, etc.). One or more of the four on-site wells identified on Figure 3.6-1 are candidates to provide construction water for the proposed wind park.

Very little water would be used during wind park operations. The only water use during the operational phase of the wind park would be for "residential"-type functions at the operations and maintenance building (e.g., bathroom, sink). Water demand at the operations and maintenance building would be limited and be sourced from an existing on-site well or be delivered to the building by truck.

Water or another approved dust suppressant would be used to suppress dust during grading of the proposed switchyard. Other than using water for dust suppression, the proposed switchyard would not use additional water or have a permanent water supply.

Each criterion, or standard, of significance cited in Section 3.6.2.1 was evaluated to determine potential impacts from project implementation.

Degradation or Contamination of Surface Water Quality

Sound water and soil conservation practices would be maintained during construction, operation, and maintenance of Foresight's proposed project to protect topsoil and adjacent water resources and minimize soil erosion. As described in the RPMs in Section 2.7, efforts would be made during wind park and transmission tie-line construction activities to minimize disturbance to vegetation, drainage channels, and stream banks. Foresight and Western would apply standard Forest Service BMPs during construction of the proposed wind park, tie-line, and switchyard. Applicable Forest Service BMPs are provided in Appendix C. Furthermore, Foresight or construction contractors would obtain any and all necessary Federal and State permits required for storm water run-off, including an AZPDES permit. For the proposed tie-line, if required, Foresight would apply for a Nationwide Permit No. 12 for utility line activities administered under Section 404 of the Clean Water Act which contains general and permit-specific mitigation conditions for areas where proposed access roads and utility lines would impact waters of the U.S. Potential impacts to waterways from spills of chemicals or fuels used during construction or operation activities would be minimized by complying with the Forest Service BMPs. A Spill Prevention, Control, and Countermeasures (SPCC) Plan would also be implemented and followed. Spill containment materials would be available at all construction sites, and crews would be trained in spill response and cleanup. As a result, construction and operation activities associated with the wind park and transmission tie-line would only result in minimal, short-term degradation or contamination of surface water and should meet State water quality standards even though surface water is not monitored by the State. Thus, no substantial degradation or contamination of surface water quality would occur.

For the proposed switchyard, Western would require its construction contractors to manage waste concrete and washing of concrete trucks, provide measures to prevent and respond to spills of hazardous and non-hazardous substances, comply and implement appropriate identified Forest Service BMPs, and obtain an AZPDES permit associated with construction of its proposed switchyard. In addition, during the design of the switchyard, a determination would be made on the need for secondary oil containment for the proposed station service transformer. Based on these requirements, construction of Western's switchyard would not degrade or contaminate surface water quality.

Degradation or Depletion Groundwater Quantity

As described in Chapter 2, Foresight's Proposed Project would require about 307 acre-feet of groundwater. Potential impact of proposed groundwater pumping for construction was projected using an analytical groundwater flow model THWELLS with available data for wells and aquifer parameters (Victor 2010). THWELLS is an analytical model based on the Theis equation that computes water level drawdown for multiple pumping wells. For this analysis, it was assumed that the four Flying M Ranch wells identified as potential production wells for construction on Figure 3.6.2 would be equipped with pumps to provide groundwater for construction. These wells were each simulated to pump continuously at about 23.8 gpm for two years (to simulate the highest potential water pumping, which would only be in effect if the wind park is fully built out to 500 MW over two consecutive years); total continuous pumping rate was modeled at about 95 gpm for two years. Other assumptions for the simulation included:

- *Aquifer Transmissivity*: Transmissivity is a measure of the ability of an aquifer to transmit groundwater. Transmissivity is defined as the rate of groundwater movement under a 1:1 hydraulic gradient through a vertical section of an aquifer one foot wide and extending the full saturated thickness of the aquifer (Theis 1935). Units for transmissivity are gallons per day per foot (gpd/ft) width of aquifer. Transmissivity is estimated by multiplying the reported specific capacity for the four wells by 1,500 which is a standard conversion factor used for non-artesian aquifer conditions. This conversion resulted in estimated transmissivity ranging from 938 to 1,875 gpd/ft. This range is below the range of values calculated for C-aquifer production wells in the Lake Mary wellfield

(3,000–24,000 gpd/ft, Montgomery and Associates 1993) and, therefore, is considered to be conservative. The harmonic mean of the estimated project area transmissivity values is 1,250 gpd/ft and was used in the simulation for the C-aquifer. The harmonic mean of a set of values is a method of calculating the average value and is typically appropriate where the average of rates is desired. The harmonic mean is less than the arithmetic and geometric mean values and, therefore, provides a conservatively low estimate.

- *Specific Yield*: Specific yield describes the amount of recoverable groundwater stored in an aquifer under "water table" or non-artesian conditions. It is defined as the volume of water that would drain under gravity from a unit volume of aquifer material and is a unitless ratio. The value of 0.05 used for the Lake Mary wellfield model for the C-aquifer (Montgomery and Associates 1993) was also used for this simulation.
- *Aquifer Saturated Thickness*: Saturated aquifer thickness for the four wells ranges from 85 to 120 feet, which represents a small fraction of the total saturated thickness for the C-aquifer beneath the project site. A saturated thickness value of 100 feet was used in the simulation.

Maximum simulated water level drawdown in each pumped well was only 52 feet after two years of continuous pumping. The cone of depression (or drawdown) caused in the water table by each well has maximum depth at each well and decreases radially away from the well. During this same timeframe, the five-foot water level drawdown contour extends less than 800 feet from each well used for construction and would be negligible for wells more than one-half mile away. Therefore, the projected impacts at other existing wells in the vicinity are minimal and are not expected to affect the existing groundwater users' ability to continue their existing uses. After project construction, groundwater levels would be expected to return quickly to pre-project conditions, so construction activities would not substantially deplete groundwater resources, or interfere with groundwater recharge. Furthermore, no long-term effects to area springs and seeps would be expected.

The construction of Western's switchyard would require the use of water, or an approved dust suppressant, during grading and concrete pouring activities. Less than ten-acre-feet of water would be required at the substation site, assuming no dust suppression would be required for road improvements to the substation. Based on the low volumes of water required for substation construction and the lack of any permanent water usage, Western's substation would not deplete groundwater or other water sources.

<u>Degradation or Elimination of Wetlands or Waters of the U.S.</u>

Potential impacts to waters of the U.S. or wetlands identified by the Forest Service could result from construction, operation, and maintenance of the proposed wind park and transmission tie-line. Potential short-term impacts to regulated washes would result from the placement of temporary roads, undergrounding of utilities, and placement of staging areas, borrow pits, concrete batch plants, and parking areas. Permanent impacts from infrastructure development would result from the placement of new service roads, culverts, and WTGs. Potential direct impacts include placement of fill or removal of materials and vegetation; altered flow path or flow volume; and spills of contaminating materials. Potential indirect impacts include increased scour and erosion in downstream areas; changes in the rate and type of sediment deposition in downstream areas; and impacts such as impeded water flow and increased sediment deposition upstream of impacted areas. Direct and indirect impacts can produce secondary effects on biological resources and water quality when vegetation responds to impacts. Typical secondary impacts include loss of vegetation and wildlife habitat as soil moisture declines and erosion hazards increase. Table 3.6-4 provides estimated potential impacts to jurisdictional waters from the initial phase of wind park development, pending USACE determination (Atwell 2011). Data on potential impacts from subsequent phases will be acquired and reviewed by USACE when those phases are developed (Atwell 2011).

TABLE 3.6-4 POTENTIAL IMPACTS TO JURISDICTIONAL WATERS, INITIAL PHASE STUDY AREA	
Location	**Estimated Impacts (acres)**
Access Road	0.1 – 0.3
Wind Park, Initial Phase Study Area	0.2 – 0.4
Transmission Tie-Line	0.1 – 0.3
Western Switchyard	No Impacts Anticipated
Source: Atwell 2011	

Foresight would avoid or minimize potential impacts to jurisdictional washes, to the extent least environmentally damaging and most practicable, through implementation of the RPMs listed in Table 2.7-1. An additional RPM added to the Final EIS is based on a three-tiered approach to minimizing impacts. The tiered approach focuses on: 1) avoidance as the primary mechanism to limit impacts to jurisdictional waters; 2) where avoidance cannot be achieved, the reconfiguring of project infrastructure to minimize the quantity of jurisdictional waters impacted; and 3) the implementation of engineering controls to further limit impacts, where practicable. Design and engineering controls might include measures such as those listed below. Please note that any given measure may not be the most practicable measure for a given case or potential impact.

- Locating wind turbines and supporting construction pads outside of the limits of the jurisdictional waters;
- Aligning support access roads and utility infrastructure parallel to the identified jurisdictional waters to avoid perpendicular crossings, where feasible;
- Where crossings cannot be avoided, locating crossings to minimize adverse effects; using culverts to limit indirect and secondary impacts to upstream and downstream waters; placing energy dissipation structures downstream of crossings as appropriate to minimize scour and erosion;
- Spanning jurisdictional waters by arch culverts or bridge where feasible;
- Burying utilities below the grade of the watercourse to assure free flow of stormwater within its jurisdictional limits, where feasible; constructing temporary trenches across the washes to locate the utilities and back fill with original materials in the selected alignment;
- Where practicable, directional drilling to limit disturbance of the jurisdictional waters by boring the planned utility under the affected watercourse;
- Where utilities are constructed over jurisdictional waters, locating support poles outside their limits, where feasible; as lines are pulled into place, temporary spans may be constructed to limit pulling of disturbed soil and vegetation debris from the banks of the drainage feature.

The impact of the initial phase is expected to affect approximately one-half acre for the initial phase study area, subject to USACE determination (Atwell 2011). Preliminarily, a similar impact for the build-out phase(s) study area in anticipated, also subject to USACE determination (Atwell 2011). The above approaches were taken into consideration to reduce and avoid impacts based on the current level of design presented in the preliminary layout plan (Figure 2.2-3). It is anticipated that final micro-siting would further incorporate the applicable design features/approaches described in the list above, and other best management practices (Atwell 2011). In addition, the BMPs outlined by the Forest Service would minimize the potential for accelerated soil erosion and sediment transport and protect water quality downstream and within wetlands. Construction activities would also be implemented to limit direct impact to identified waters of the U.S.

Potential impacts to jurisdictional washes would be further minimized by adhering to regulations and permits governing storm water pollution prevention and sediment control such as a Construction General Permit through AZPDES and a Federal Section 404 permit. Foresight consulted with USACE in November 2010 and would pursue a Section 404 permit for the initial phase because it is a separate and complete project for purposes of a Section 404 permit. Mitigation could be provided as a provision of the Section 404 permit(s) issued by the USACE. As subsequent phases of development undergo final design, preliminary jurisdictional determinations would be prepared and separate Section 404 permits obtained. Foresight anticipates a similar range of potential impacts for the subsequent phase(s) if the project is built out to 500 MW (Atwell 2011). Implementation of the project RPMs and permits would ensure that potential impacts to surface water flows, drainage patterns, quantity and quality are less than significant during wind park and transmission tie-line construction, operation, and maintenance activities.

Western's proposed switchyard would not be constructed within waters of the U.S. or near a Forest Service-identified wetland. Western would ensure that surface water is protected from pollution caused by construction activities, and require its construction contractor to obtain the appropriate permits. Therefore, it would not degrade or eliminate any wetlands or waters of the U.S.

<u>Alteration of Surface Drainage Patterns or Stream Channel Morphology</u>

The majority of both temporary and permanent disturbances associated with the proposed wind park and transmission tie-line would be on land currently used for rangeland and agriculture with low representative slopes. The primary exception to this associated with the proposed tie-line as it extends up the slope of Anderson Mesa. Construction within the wind park study area and along the transmission tie-line would result in grading, excavation, and exposure of soil, some of which may occur within or adjacent to existing streams or drainages. As described in the RPMs in Section 2.7, Foresight would avoid, to the extent possible, placing temporary or permanent facilities in floodplains and washes and ensure that all construction activities minimize disturbance to drainage channels and stream banks. Construction methods would minimize erosion and would include installation of cross drains, placement of water barriers adjacent to roads, and the application of other BMPs. As a result, alteration of flow patterns is not anticipated and would be avoided wherever possible.

The site proposed for Western's switchyard is not within an area where substantial alteration of the surface drainage patterns would be required. All surface drainage would be designed to flow around the switchyard site and left in a condition to facilitate natural revegetation and prevent erosion.

<u>Alteration of Flows Within a Flood Hazard Area</u>

On-site or off-site flooding would not result from construction, operation, or maintenance of the proposed project components. Flood hazard zones have not been identified within or adjacent to the proposed project components. The final engineering design for the wind park and transmission tie-line would evaluate site conditions and use the RPMs listed in Section 2.7 associated with applicable permits to address potential flooding. As a result, construction and operation of the proposed wind park and transmission tie-line would not would impede or redirect flood flows, and applicable water resources significance thresholds would not be exceeded.

The proposed Western switchyard would not be located within a floodplain or an area prone to flooding.

3.6.2.3 Alternative Transmission Tie-line Corridor

The alternative transmission line alignment would result in similar impacts as described for the proposed transmission tie-line. No ground or surface water resources are site specific to the location of the alternative tie-line alignment.

3.6.2.4 No Action Alternative

Under the No Action Alternative, no groundwater would be pumped, maintaining groundwater and surface water quantity and quality similar to current condition. In addition, surface water conditions would not be affected. As a result, no impacts to ground or surface water would be expected.

3.7 SOCIOECONOMICS

3.7.1 Affected Environment

3.7.1.1 Resource Evaluation Area

The socioeconomic analysis focused on an evaluation area that included Coconino and Navajo counties, including the cities of Flagstaff and Winslow. The socioeconomic evaluation area was defined by the regional transportation network and the available labor force within a reasonable distance of the proposed project components. Both distance and geographic features were taken into consideration when determining which communities were to be included in this analysis.

3.7.1.2 Characterization

This section describes existing conditions associated with the economy of the socioeconomic evaluation area including population, economic base, employment, income, housing, and public services.

Population

Population within the socioeconomic evaluation area has grown substantially over the past 20 years. A summary of current and historic population is included as Table 3.7-1.

TABLE 3.7-1
POPULATION TRENDS

Location	Population			Percent Change 1990 to 2008
	1990	2000	2008	
Arizona	3,665,228	5,130,632	6,629,455	80.9
Coconino County	96,591	116,321	135,614	40.4
Navajo County	77,658	97,470	114,780	47.8
City of Flagstaff	45,857	52,894	64,693	41.1
City of Winslow	8,190	9,520	10,194	24.5

Sources: Arizona Department of Commerce 2009a, 2009b, 2009c, and 2009d

Economic Base, Employment, and Income

The economies of both Coconino and Navajo counties are based largely on educational services, and health care and social assistance. These industries account for approximately one-quarter of the work force in both counties. The construction trade employs 9.6 percent of the work force in Coconino County and 14.5 percent in Navajo County, accounting for approximately 12,194 total jobs (U.S. Census Bureau 2008b and 2008f).

The average annual labor force, including unemployment, for the socioeconomic evaluation area is summarized in Table 3.7-2.

TABLE 3.7-2 LABOR FORCE, 2006–2008				
Industry	**Coconino County**	**Navajo County**	**City of Flagstaff**	**City of Winslow**
EMPLOYED				
Agriculture/Forestry/Fishing and Hunting/Mining	789	1,174	384	20
Construction	6,196	5,938	2,894	197
Manufacturing	4,339	1,441	2,977	71
Wholesale Trade	1,107	714	480	29
Retail Trade	8,029	5,269	4,832	449
Transportation and Warehousing/Utilities	3,614	2,480	1,199	361
Information	704	475	488	18
Finance and Insurance/Real Estate/Rental and Leasing	2,592	1,554	1,718	107
Professional/Scientific/Management and Administrative/Waste Management Services	3,366	1,598	1,680	95
Educational Services/Health Care and Social Assistance	16,623	9,787	9,913	752
Arts and Entertainment/Recreation/ Accommodation/Food Services	9,568	4,692	5,737	402
Public Administration	4,221	3,942	1,657	507
Other Services	3,150	1,934	1,583	151
UNEMPLOYED	3,329	4,910	1,414	196
TOTAL LABOR FORCE	**67,690**	**45,967**	**37,019**	**3,355**
Sources: U.S. Census Bureau 2000b, 2008b, 2008d, and 2008f				

The median household income for Coconino and Navajo counties is $49,611 and $39,678, respectively. The median household income for the City of Flagstaff is $49,885, nearly identical to Coconino County as a whole. The median household income for the City of Winslow is $29,741, substantially lower than the median for Navajo County (U.S. Census Bureau 2000b, 2008b, 2008d, and 2008f).

Currently, the primary source of revenue or employment within the wind park study area is cattle ranching. In 2005, Coconino County amended the Coconino County Comprehensive Plan to include the Diablo Canyon RPA. The Diablo Canyon RPA was developed with a primary objective to maintain historic ranching operations while identifying economic opportunities that would supplement ranching incomes and provide a way to offset the costs of range improvements. The plan specifically identifies five economic activities that would achieve the primary objective, including: 1) value added beef; 2) tourism, recreation, and education; 3) wood products; 4) energy development; and 5) housing.

Housing Market and Property Values

There are over 100,000 housing units in Coconino and Navajo counties. Of these, more than 30,000 are classified as vacant. This number includes vacation homes, popular in Arizona's high country, which are seasonally occupied. A more accurate characterization of available housing is vacancy rates. These rates along with other selected housing data for the evaluation area are summarized in Table 3.7-3.

TABLE 3.7-3 HOUSING DATA, 2006–2008				
Description	**Coconino County**	**Navajo County**	**City of Flagstaff**	**City of Winslow**
Owner occupied housing units	27,620	24,725	11,952	1,505
Renter occupied housing units	15,716	9,115	10,908	995
Vacant housing units	15,433	18,548	3,302	451
Homeowner vacancy rate	3.1 %	2.7 %	3.9 %	n/a
Rental vacancy rate	4.9 %	4.1 %	4.8 %	n/a
Median house value	$284,600	$130,800	$331,100	$61,900
Median gross rent/month	$868	$606	$937	$428
Sources: U.S. Census Bureau 2000a, 2008a, 2008c, and 2008e				

Public Services and Facilities

Organizing and providing services to a geographically dispersed citizenry is a challenge for rural jurisdictions such as Coconino and Navajo counties. The wind park study area is located within an area with very few residences, and community services are limited. Public services and institutions within the evaluation area are described below:

Schools and Libraries

Two school districts are located within the socioeconomic evaluation area, Flagstaff Unified School District (USD) and Winslow USD No. 1. The Flagstaff USD operates three high schools, four middle schools, nine elementary schools, and four magnet schools. The Winslow USD No. 1 includes one high school, one middle school, and three elementary schools.

Coconino and Navajo counties operate community libraries in the cities of Flagstaff and Winslow, respectively.

Law Enforcement

Law enforcement is provided to unincorporated portions of the socioeconomic evaluation area through the Coconino County Sheriff's Department and the Navajo County Sheriff's Department. The proposed project components would be served by the Coconino County Sheriff's Department, and the nearest Sheriff's Office is located in Flagstaff.

Fire Protection

Multiple fire departments are located throughout the socioeconomic evaluation area in both Coconino and Navajo counties. The proposed project components would be served by the Mormon Lake Fire District, located along the south end of Mormon Lake, near Lake Mary Road. Additional service could be provided, as needed, by the Summit Fire District on Koch Field Road east of Flagstaff and the Arizona State Land Department Fire District on Lake Mary Road in Flagstaff.

Health and Social Services

Two hospitals are located within the socioeconomic evaluation area, Flagstaff Medical Center and Winslow Memorial Hospital. The Flagstaff Medical Center has 270 inpatient beds and 200 physicians on active medical staff. The Winslow Memorial Hospital is smaller and includes 34 inpatient beds.

Water, Wastewater, and Solid Waste

Centralized water and wastewater service is provided by the cities of Flagstaff and Winslow. Unincorporated areas of Coconino and Navajo counties obtain water from private wells and dispose of wastewater through private septic systems. The nearest landfill is the Cinder Lake Landfill, more than 25 miles from proposed wind park, operated by the City of Flagstaff.

3.7.2 Environmental Consequences

This section evaluates the potential impact of the proposed wind park, proposed transmission tie-line, and Western's proposed switchyard on the socioeconomic environment. Overall, the proposed project components would have a beneficial impact on the economies of Coconino and Navajo counties. The proposed wind park would improve local employment and business activity and contribute to local tax revenue.

3.7.2.1 Standards of Significance

Impacts to socioeconomics would be considered significant if any of the following conditions occur:

- Induce population growth that would strain government and community facilities and services from the in-migration of the proposed workforces.
- Result in insufficient existing housing in the evaluation area to meet the needs of in-migrating workers and their families.
- Create the need for a major new utility system, or substantially alter an existing utility system, including power or natural gas, communications systems, water, sewer, or solid waste disposal.

3.7.2.2 Foresight's Proposed Project and Proposed Federal Actions

Construction of the proposed wind park would require approximately 400 temporary workers at peak construction activity for each phase, and each phase would last between 12 and 18 months. Following construction, it is anticipated that 17 to 40 permanent employees would conduct operations and maintenance of the wind park, if fully built out to 500 MW.

Contracts for the construction of the proposed wind park and transmission tie-line would be part of a competitive bidding process for each phase. Local workers and construction firms would have the opportunity to apply for or bid on many of these jobs. It is anticipated that substantial employment efforts would flow through local construction and service firms that successfully obtain contracts through the construction bidding process. Western would issue a separate solicitation for the construction of the proposed switchyard in accordance with Western's contracting requirements.

Particularly during the construction phase, construction employment and activities would benefit the local economy. Personal income from employment would increase local spending through purchases of consumer goods and services, lodging, transportation, and utilities. Local businesses providing construction materials and services, equipment repair, and maintenance services would likely experience increased revenues from each of the proposed project components' construction budget. These direct expenditures would generate additional jobs and revenue at the local, city, and county levels. Due to the availability of construction workers and existing construction and service firms in the socioeconomic evaluation area and the relatively short duration of the construction, construction-related expenditures would not induce population growth that would strain government and community facilities and services from the in-migration of the construction workforce. Once construction is finished, operations would require annual expenditures and payroll that, when spent, would generate additional personal income and employment. In addition, the proposed wind park would supplement the incomes of ranchers currently using the area to raise cattle. Energy development, specifically energy from wind resources, was identified by the Diablo Canyon RPA as a compatible economic pursuit that would meet the plan's primary objective to maintain traditional ranching operations. The wind park would provide new revenues to the ASLD from the lease of State trust lands, optimizing economic return for the trust beneficiaries.

Sufficient existing housing is available within commuting distance of the proposed project components to meet the needs of in-migrating construction workers and their families, as well as permanent workers and their families. More than 30,000 housing units are currently vacant within Coconino and Navajo counties.

The majority of jobs created by the proposed wind park are expected to be temporary. Between 17 and 40 permanent employees would be hired to operate and maintain the proposed wind park if fully built-out to 500 MW, at least some of whom would be hired from the local labor force. This would lead to a slightly greater demand on public facilities, including schools, which would likely be spread across several jurisdictions. However, vacancy rates in housing units suggest capacity is available.

None of the proposed project components, including the O&M facility proposed as part of the wind park, would use public water and sewage systems. Rather, potable water would be supplied from an on-site well or hauled in periodically by a commercial water hauler. In addition, sewage would be disposed of on-site through a septic system that would be installed. The proposed wind park would not directly require the use of public facilities, nor would it substantially induce growth that would increase the demand on public facilities and services or infrastructure. Thus, there would not be a need to install or alter a major new utility system and significance thresholds would not be exceeded.

3.7.2.3 Alternative Transmission Tie-line Corridor

The alternative transmission tie-line would not alter potential impacts, including beneficial impacts, to socioeconomic resources from those discussed under the proposed transmission tie-line.

3.7.2.4 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection for the Grapevine Canyon Wind Project and the Forest Service would not issue a permit for the transmission tie-line proposed for the wind park. The proposed wind park, transmission tie-line, and switchyard would not be constructed and the beneficial socioeconomic impacts associated with the construction, operations, and maintenance of the wind park would not occur. In addition, the economic objectives of the Diablo Canyon RPA would not be realized as quickly, since no other similar economic development proposals for this area are currently under consideration.

3.8 ENVIRONMENTAL JUSTICE

3.8.1 Affected Environment

3.8.1.1 Resource Evaluation Area

The environmental justice analysis focused on an evaluation area identical to socioeconomics which included Coconino and Navajo counties. For purposes of this analysis, the affected population is considered to be residents of these two counties.

3.8.1.2 Characterization

EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) requires that projects and proposals be examined to ensure that negative effects are not disproportionately distributed on at-risk populations including low-income, minority, and elderly.

The wind park study area is located on private and State trust lands with no permanent residences. A few rural ranching residences are located in proximity to the wind park study area, but very few other residences are located within several miles.

The Hopi Hart Ranch, north of the wind park study area, and the Clear Creek Ranch, east of the wind park study area, were conveyed from fee simple land held by the Hopi Tribe to the U.S. in Trust for the Hopi Tribe in December 2008. The Navajo Nation is located more than ten miles north of the proposed wind park.

The proposed transmission tie-line, alternative transmission tie-line, and Western's proposed switchyard are located on Federal lands under the jurisdiction of the Forest Service. Forest Service-managed lands are managed for multiple uses and are open to the public. Forest Service-managed lands in the vicinity of the proposed transmission tie-line and switchyard generally are leased for grazing; used for dispersed recreation, including hiking, camping, and wildlife viewing; hunting; and gathering firewood.

The population of Coconino and Navajo counties is more racially diverse than the State of Arizona as a whole. In particular, a large Native American population resides within these two counties. In addition, low-income populations are slightly more prevalent within these two counties than the State of Arizona as a whole. Data on minority and low-income populations throughout Coconino and Navajo counties and the cities of Flagstaff and Winslow are summarized in Table 3.8-1. Data for the State of Arizona are provided for context.

TABLE 3.8-1
MINORITY AND LOW-INCOME CHARACTERISTICS OF
ENVIRONMENTAL JUSTICE EVALUATION AREA, 2006–2008

Race or Ethnicity	Arizona		Coconino Co.		Navajo Co.		Flagstaff		Winslow	
	Persons	%	Persons	%	Persons	%	Persons	%	Persons	%
White	4,928,000	78	78,675	62	50,204	45	46,860	74	5,004	52
Black	224,000	4	1,549	1	1,261	1	1,205	2	493	5
Native American	285,000	5	35,954	28	50,536	46	8,352	13	2,234	23
Asian	150,000	2	1,650	1	323	0.3	1,163	2	98	1
Other	558,000	9	6,548	5	5,196	5	4,390	7	1,284	13

TABLE 3.8-1 MINORITY AND LOW-INCOME CHARACTERISTICS OF ENVIRONMENTAL JUSTICE EVALUATION AREA, 2006–2008										
Race or Ethnicity	**Arizona**		**Coconino Co.**		**Navajo Co.**		**Flagstaff**		**Winslow**	
	Persons	**%**	**Persons**	**%**	**Persons**	**%**	**Persons**	**%**	**Persons**	**%**
Hispanic/Latino (of any race)	1,877,000	30	15,454	12	10,865	10	11,001	17	2,746	29
Individuals Below Poverty Level	907,200	14	20,748	16	24,847	22	9,780	15	1,990	20.9
Sources: U.S. Census Bureau 2000a, 2000b, 2008a, 2008b, 2008c, 2008d, 2008e, 2008f, and 2008g										

3.8.2 Environmental Consequences

The assessment of environmental justice evaluates the impacts to the human environment associated with the proposed project components in context with minority, low-income, and Native American populations within the environmental justice evaluation area. The following definitions are excerpted from EO 12898:

Disproportionately high and adverse human health effects: When determining whether human health effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

a) Whether the health effects, which could be measured in risks and rates, are significant (as employed by NEPA), or above generally accepted norms. Adverse health effects could include bodily impairment, infirmity, illness, or death.
b) Whether the risk or rate of hazard exposure by a minority population, low-income population, or Indian tribe to an environmental hazard is significant (as employed by NEPA) and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group.
c) Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

Disproportionately high and adverse environmental effects: When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

a) Whether there is or would be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects could include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment.
b) Whether environmental effects are significant (as employed by NEPA) and are or could be having an adverse impact on minority populations, low income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group.
c) Whether the environmental effects occur or would occur in a minority population, low income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

3.8.2.1 Standards of Significance

Impacts would be considered significant if the following were to occur as a result of the proposed project:

- Disproportionately affect a minority, Native American, or low-income subsistence populations.

3.8.2.2 Foresight's Proposed Project and Proposed Federal Actions

There is no resident population (low-income, minority, Native American, or otherwise) that would be directly affected by construction and operation of the proposed wind park, proposed transmission tie-line, or Western's proposed switchyard.

Forest Service-managed lands in the vicinity, open to the public, are not known to be used in disproportion by Native American, minority, or low-income populations. Therefore, impacts, as a result of the proposed transmission tie-line and Western's proposed switchyard, to activities occurring on this portion of the Forest are expected to be very low.

Within the two-county region, the Navajo Nation is located more than ten miles to the north of the proposed wind park, the Hopi Tribe Trust lands and the Hopi Reservation are north and east of the proposed wind park, and the nearest population centers, Flagstaff and Winslow, are located more than 20 miles from the proposed wind park. The proposed wind park, proposed transmission tie-line, and Western's proposed switchyard would not create disproportionately negative impacts on the Navajo Nation, the Hopi Tribe, or on low-income or minority groups. Moreover, the regional socioeconomic impact of the proposed wind park is beneficial in that it would create employment opportunities, economic multiplier effects, and tax revenue that would indirectly, and possibly directly, benefit persons living below the Federal poverty level within the environmental justice evaluation area.

3.8.2.3 Alternative Transmission Tie-line Corridor

Impacts to minority, Native American, and low-income subsistence populations would not differ from those associated with the proposed transmission tie-line if the alternative transmission tie-line were to be constructed and operated.

3.8.2.4 No Action Alternative

If the proposed wind park were not constructed, impacts associated with employment opportunities and tax revenue would not benefit persons living below the Federal poverty level within the environmental justice evaluation area.

3.9 TRANSPORTATION

3.9.1 Affected Environment

3.9.1.1 Resource Evaluation Area

The transportation resource evaluation area for transportation includes an area within one mile of the wind park study area, proposed transmission tie-line, and Western's proposed switchyard. In addition, the primary access routes that would be used for employees accessing the project components and for the delivery of equipment and materials are part of the transportation evaluation area. These include the I-40/Meteor Crater interchange, Meteor Crater Road, and Lake Mary Road near its intersection with FS 125. These primary access routes were determined to be the areas where the potential hazard or risk, including traffic concerns, would be the greatest.

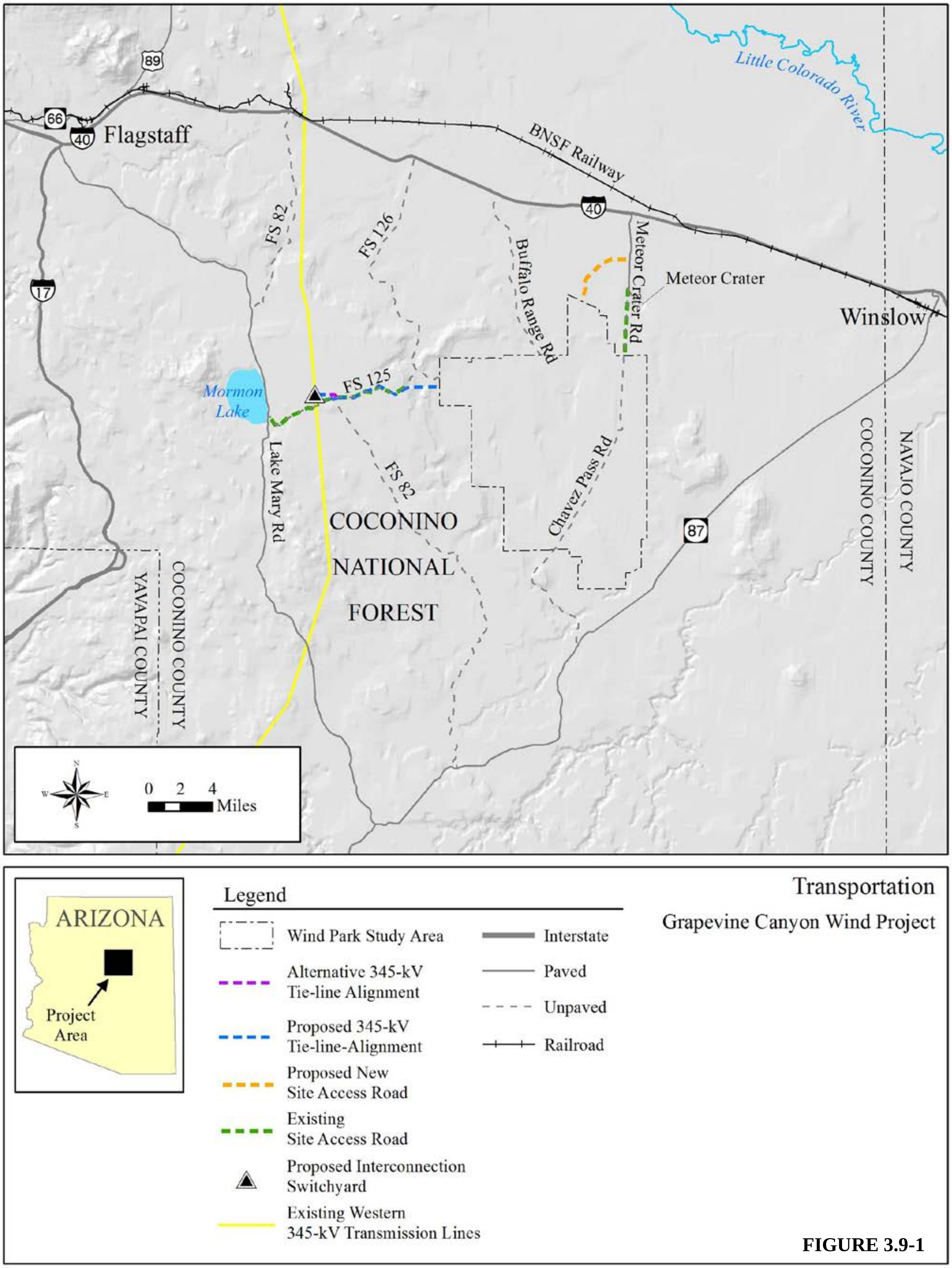
Data was gathered through field verification and the review of various documents and maps. Sources of information include published land use plans and reports including the Coconino County Comprehensive Plan, the Diablo Canyon RPA, the Forest Plan, and various reports available from the Arizona Department of Transportation (ADOT). In addition, contacts were made with jurisdictional and agency personnel and websites were accessed for information. Information on aircraft use within the evaluation area was also collected.

3.9.1.2 Characterization

Ground transportation features are considered to be substantial roads and highways, such as interstate highways, State highways, county and other major roads, and railroads. Interstate or State highways include all dedicated Federal or State highway routes maintained by ADOT. County roads include all major roads maintained by Coconino County that represent major interconnections between interstate, Federal, or State highways with major access routes in rural areas. Regularly maintained and non-maintained Forest Service System roads and roads that cross State trust lands also are present within the transportation evaluation area. The roads are depicted below in Figure 3.9-1. Table 3.9-1 lists existing roads within or adjacent to the transportation evaluation area.

Surface transportation features within and adjacent to the transportation evaluation area include Federal and county jurisdictional roads. I-40 is the principal arterial within the transportation evaluation area and is under the jurisdiction of the ADOT. Lake Mary Road is a major road which provides local access to Flagstaff, as well as to Lake Mary and Mormon Lake, among many other recreation areas on National Forest System lands. FS 125 and FS 126 (Twins Arrows Road) provide access to National Forest System lands, and FS 125 and FS 82 provide access to Kinnikinick Lake and other recreation areas.

Meteor Crater Road is a paved road that extends from I-40 to Meteor Crater. Buffalo Range Road (which does not connect to the wind park study area) and Chavez Pass Road are both considered primitive local roads and are not maintained regularly by the county. Signage on these roads warns vehicle operators that they are taking a risk driving on the roadways. Other roads within the transportation evaluation area include dirt ranch roads and jeep trails allowing access to rural development in the area, low-maintenance roads across State trust lands and National Forest System lands, and illegal/non-system roads created by recreation users with all-terrain vehicles (ATVs) and other off-highway vehicles (OHVs).



Transportation

Grapevine Canyon Wind Project

FIGURE 3.9-1

TABLE 3.9-1 SUMMARY OF ROADS WITHIN THE TRANSPORTATION EVALUATION AREA		
Roads	**Surface**	**Jurisdiction**
NORTH-SOUTH ROADS		
State Route (SR) 87	Paved (asphalt)	ADOT
Lake Mary Road (Forest Hwy 3)	Paved (asphalt)	Forest Service/Coconino County/Flagstaff
FS 126 (Twin Arrows Road)	Unpaved (dirt)	Forest Service/Coconino County
Buffalo Range Road	Unpaved (dirt)	Coconino County
Meteor Crater Road	Paved (asphalt)	Coconino County
Chavez Pass Road	Unpaved (dirt)	Coconino County
FS 82	Unpaved (dirt)	Forest Service
EAST-WEST ROADS		
I-40	Paved (asphalt)	Federal Highway Administration/ADOT
FS 125	Paved (gravel)/unpaved (dirt)	Forest Service

Traffic volumes for the roadways located within the transportation evaluation area are shown below in Table 3.9-2. The majority of motor vehicle traffic is limited to local commuters, ranchers, recreationists, and tourists.

TABLE 3.9-2 TRAFFIC VOLUME ON HIGHWAYS AND ROADS IN TRANSPORTATION EVALUATION AREA						
Route	**Start**	**End**	**Length (miles)**	**AADT[1]**	**POS[2]**	**NEG[3]**
I-40	Exit 211 Winona Rd	Exit 219 FS 126 (Twin Arrows Rd)	8.41	14,676	6,802	7,872
I-40	Exit 219 FS 126 (Twin Arrows Rd)	Exit 225 Buffalo Range Rd	5.47	16,600	7,763	8,930
I-40	Exit 225 Buffalo Range Rd	Exit 230 Canyon Diablo Road/ Two Guns	5.41	16,002	7,783	8,217
I-40	Exit 230 Canyon Diablo Rd/ Two Guns	Exit 233 Meteor Crater Rd	3.42	15,340	7,167	8,175
I-40	Exit 233 Meteor Crater Rd	Exit 239 Dennison Rd/ Meteor City Rd	5.78	16,089	n/a	n/a
Lake Mary Rd*	South of Upper Lake Mary	—	n/a	1,239	n/a	n/a
SR 87	Lake Mary Rd	SR 99	50.31	700	n/a	n/a
Meteor Crater Rd	I-40	End/Chavez Pass Rd	n/a	830	n/a	n/a
Chavez Pass Rd	Meteor Crater Rd	SR 87	n/a	21	n/a	n/a
[1] AADT – Annual Average Daily Traffic volume estimate (bi-directional) [2] POS – Annual Average Daily Traffic volume estimate, increasing highway milepost numbers [3] NEG – Annual Average Daily Traffic volume estimate, decreasing highway milepost numbers n/a – data not available						
Source: ADOT 2009; Coconino County Public Works Department. * From: Traffic Resource and Analysis, Inc., taken July 2007.						

Generally traffic is free flowing on both County and ADOT maintained roads and there are no major traffic congestion concerns within the transportation evaluation area.

Cross-country travel of motorized vehicles are currently allowed on Forest Service-managed lands for recreational activities, such as sightseeing, camping, hiking, hunting, and fishing. Motorized travel is permitted, except in areas that are signed as closed or restricted to seasonal use. On May 1, 2012 the Coconino National Forest is implementing new travel management rules that will restrict the large majority of motor vehicle use to designated roads, trails, and areas on Forest Service-managed lands. This will have the result of restricting all off-road travel except in designated areas and in those situations where motor vehicle use is exempt from the rule (i.e., when authorized under Federal permit or in emergencies). These new rules allow motorized use on over 3,000 miles of existing roads and trails (including Forest Road 125) and include over 600 miles of roads with dispersed camping corridors where one may drive off the road up to 300 feet for the purpose of car camping. The effect of this change is to restrict off-road travel and close almost 1,000 miles of drivable roads in areas with the most sensitive wildlife, watershed, archeological, or scenic areas. The Forest expects to focus on implementation through education for the first year. Other forests throughout the nation that have implemented similar changes have found they take approximately a decade to reach full implementation.

The Burlington Northern Santa Fe Railway provides regional rail freight service. The railway is located approximately ten miles north of the wind park study area, traveling in an east-west direction mostly parallel to I-40 (Pearsell 2002).

No regional or municipal airports are in the immediate vicinity of the transportation evaluation area; however, the AGFD conducts wildlife surveys in the area using low-flying aircraft. The closest airports are in Flagstaff and Winslow, both of which are approximately 25 miles from the wind park study area.

Western uses a helicopter to patrol the existing 345-kV transmission lines. The lines are patrolled quarterly to look for damaged transmission tie-line insulators and other transmission structure maintenance needs. Western's helicopter flies at low levels over the transmission tie-line rights-of-way.

3.9.2 Environmental Consequences

3.9.2.1 Standards of Significance

Implementation of the proposed wind park, transmission tie-line, and Western's proposed switchyard would have a significant and adverse effect on transportation if it would:

- Result in the permanent disruption of regional or local vehicle traffic.
- Result in the destruction of existing road or railroad infrastructure.
- Encroach upon an FAA-designated air safety zone around an existing airport or create an air safety hazard.

3.9.2.2 Foresight's Proposed Project and Proposed Federal Actions

Construction

Project construction activities would temporarily increase traffic volume on roadways within the transportation evaluation area as a result of both commuting construction workers and the transportation of equipment and materials.

Heavy equipment, construction materials and supplies, and labor required for the proposed project components would access the site from I-40 at Meteor Crater Road or Lake Mary Road. From these roads, there are three potential site access routes into the project area. The primary point of access for the proposed wind park and for the eastern-most portion of the transmission tie-line would be along a newly constructed access road extending from Meteor Crater Road for approximately 8.5 miles into the proposed wind park. The second, an existing access road to the proposed wind park for future phases would utilize Chavez Pass Road, located just south of Meteor Crater Road. This road extends into the wind park study area and is expected to require no improvements outside of the existing right-of-way. Access to the western-most portion of the proposed transmission tie-line and Western's proposed switchyard would occur from Lake Mary Road along existing FS 125. This road could need improvement with the existing roadway near Lake Mary Road.

It is anticipated that several types of light, medium, and heavy-duty construction vehicles would travel to and from the project area, as well as private vehicles used by construction personnel. Overweight and/or oversized loads associated with the delivery of construction equipment, WTG components, transmission tie-line structures, and switchyard equipment would be via semi-truck trailers. If one crane capable of erecting the WTG towers and attaching the blades is on-site, about 10 to 13 semi-truck loads could be transported to the wind park site per equipment delivery day for the duration of construction. If two cranes are on-site, 20 to 26 semi-truck loads could be transported and unloaded within the wind park study area per equipment delivery day over a 12 to 18 month construction period per project phase. Construction traffic associated with the proposed transmission tie-line and switchyard would be approximately ten trucks per day, occurring over a period of six to ten months.

The number of anticipated passenger vehicle trips per day that would occur during construction would vary depending on the construction stage and the number of carpool vehicles. It is anticipated that the majority of the workforce for construction would travel to the site from Flagstaff, Winslow, and nearby cities and towns within a 50-mile radius. For the wind park construction, the worst case scenario is where all workers commute in vehicles with only one occupant, yielding a peak trip generation of approximately 400 inbound trips during the morning peak period and another 400 outbound trips during the evening peak hour for peak construction activity periods for the proposed wind park. Construction and associated traffic is expected to occur over a period of 12 to 18 months. Worker traffic associated with the transmission tie-line and switchyard construction is expected to be approximately 25 vehicles per day, occurring over a period of six to ten months.

The movement of equipment, materials, and workers during construction would cause a short-term increase in the level of service of local roadways. Equipment, materials, and workers transport to the proposed wind park would not be expected to cause a substantial disruption to traffic or to level of service along I-40, but overweight and/or oversized loads could result in temporary road closures or detours and traffic delays at the I-40/Meteor Crater Road interchange and along Meteor Crater Road during transport of large construction equipment and WTG components. These disruptions would be expected to occur during the peak construction periods when delivery of equipment and construction for the foundation and tower assembly would take place. The vast majority of traffic along Meteor Crater Road is associated with visitation to Meteor Crater. This site attracts approximately 230,000 visitors a year, which correlates to an average of about 315 vehicles per day (Arizona Office of Tourism 2007). In addition, small amounts of other local traffic use the road to access private land in the vicinity or to travel along Chavez Pass Road to access State Route (SR) 87. The limited amount of traffic utilizing the I-40/Meteor Crater Road interchange and Meteor Crater Road, combined with Foresight's commitment to develop a traffic control plan for the interchange and road, would not result in permanent traffic disruptions or safety concerns at the I-40/Meteor Crater interchange and Meteor Crater Road.

Increased traffic impacts for the proposed transmission tie-line and Western's proposed switchyard would occur near the Lake Mary Road/FS 125 intersection. Some restriction or temporary closure of FS 125 could also occur during the delivery of equipment and materials to the proposed transmission tie-line right-of-way or to the proposed switchyard site. These would be intermittent and temporary and would only occur for a portion of the expected 12 to 18 month construction period. Construction traffic would be limited and occur at the beginning and the end of the day.

Construction traffic associated with proposed wind park, transmission tie-line, and Western's proposed switchyard would not result in the permanent disruption of regional and local traffic and thereby would not have a significant impact.

Shipments of overweight and/or oversized loads might require fortification of culverts and temporary removal of obstructions to accommodate overweight or oversized shipments. The need for such actions would be determined on a site-specific basis. In the event a road is damaged during construction of the proposed project components, the roadway would be repaired to pre-construction conditions as detailed in Section 2.7, resulting in a minimal, but temporary, impact. Applicable significance thresholds to transportation would not be exceeded.

The proposed wind park, transmission tie-line, and Western's proposed switchyard are not expected to use rail for the transport of project-related equipment. Furthermore, the Burlington Northern Santa Fe Railroad tracks would not be crossed by construction or passenger vehicles.

<u>Operation and Maintenance</u>

Traffic associated with operation of the proposed wind park is expected to be minimal. During operations, the wind park is expected to be attended by a small maintenance and operation crew. Consequently, transportation activities would be limited to a small number of daily trips by pickup trucks, medium-duty vehicles, or personal vehicles. It is possible that large components could be required for equipment replacement in the event of a major mechanical repair. However, such shipments would be expected to be infrequent.

Traffic associated with the operation of the proposed transmission tie-line and Western's proposed switchyard would be more limited. Maintenance crews would occasionally drive the transmission tie-line access roads to inspect the transmission tie-line. Western's proposed switchyard would be visited periodically by Western's maintenance personnel to conduct inspections and test equipment. Access to the transmission tie-line and/or switchyard by heavy equipment could be required on occasion if repairs are needed.

Thus, operation and maintenance of the proposed wind park, transmission tie-line, and Western's proposed switchyard would not result in a permanent disruption of regional or local vehicle traffic and would not exceed significance thresholds listed in Section 3.9.2.1.

No regional or municipal airports are in the transportation evaluation area. The closest airports are located approximately 25 miles from the wind park study area in both Flagstaff and Winslow. As a result, the proposed project components would not impact an FAA-designated air safety zone around an existing airport.

The FAA regulates obstructions to navigable airspace (14 CFR 77, or FAA Part 77). Foresight is required to notify the FAA Administrator of any proposed construction "of facilities more than 200 feet in height above the ground level at its site" (Section 77.13[a][1]). The height of towers and length of blades proposed for the wind park have a combined height of approximately 424 feet, exceeding the FAA notice threshold. Foresight would coordinate with the FAA and meet requirements for lighting as outlined in the RPMs (Section 2.7). Thus, the proposed towers would not create an air hazard.

The AGFD's use of low-flying aircraft in the area is needed to conduct wildlife surveys; however, such use creates the potential for dangerous incidents to occur between towers, turbines, transmission lines, and aircraft. The proposed wind park and transmission tie-line would comply with the recommendations for tower and turbine construction and safety to aircraft pilots, as outlined in the AGFD's *Guidelines to Reducing Impact to Wildlife from Wind Energy Development in Arizona*. Adherence to these guidelines, in addition to the required FAA lighting, would help to keep pilots and personnel safe and eliminate any air hazards with towers, turbines, and associated transmission lines. The construction, operation, and maintenance of the proposed project components would, therefore, not create an air hazard, and significance thresholds applicable to aviation would not be exceeded.

3.9.2.3 Alternative Transmission Tie-line Corridor

Transportation impacts associated with construction and operation of the alternative transmission tie-line would generally be the same as those described for the proposed transmission tie-line. The alternative transmission tie-line would require the construction of a new access road over a distance of approximately three-quarter mile. This new access road could lead to an increase in off-road vehicular traffic on this particular portion of Forest Service-managed lands and could require that new access roads are signed closed if illegal use becomes an issue.

3.9.2.4 No Action Alternative

Under the No Action Alternative, transportation would not be affected. Under this alternative, Western would not approve an interconnection for the Grapevine Canyon Wind Project and the Forest Service would not issue a permit for the transmission tie-line proposed for the wind park. The wind park, transmission tie-line, and switchyard would not be constructed and transportation would remain unchanged.

3.10 HEALTH, SAFETY, AND SECURITY

3.10.1 Affected Environment

3.10.1.1 Resource Evaluation Area

The resource evaluation area for health, safety, and security includes the wind park study area, transmission tie-line, Western's switchyard, and an area within one mile of each of these project components. In addition, primary access routes are included as part of this evaluation area. These include the I-40/Meteor Crater interchange, Meteor Crater Road, and Lake Mary Road near its intersection with FS 125. These areas were determined to be the areas where the potential hazard or risk, including traffic concerns, would be the greatest.

3.10.1.2 Characterization

The health, safety, and security resource evaluation area is rural in nature with low population density. One residence associated with the Flying M Ranch Winter headquarters is located immediately to the west of the wind park study area. The predominant activities are ranching and dispersed recreation.

This section describes the existing health, safety, and security issues in the resource evaluation area. These include potential risks associated with wildfire and high-voltage transmission lines. Existing conditions related to vehicular traffic and aviation are discussed under the transportation section.

Wildfire Hazard

Fire risks are present in the health, safety, and security evaluation area, especially near the proposed transmission tie-line and Western's proposed switchyard located on Forest Service-managed lands. No fires have occurred in the vicinity of the proposed transmission tie-line or switchyard in recent history, but because the resource evaluation area around the proposed facilities is generally arid rangeland with a predominant groundcover of grasses, cacti, small shrubs, and trees the greatest risk of fire would be during the hot, dry Summer season. Once started, a range fire could spread rapidly. The rate, extent, and direction of spread would be dependent on the location of the fire, available fuel, temperature, wind speed and direction, presence or absence of fire breaks, and response time and capability of emergency responders. Fire safety and emergency response services are provided by local emergency response agencies. Although these services are available in incorporated areas within the County, they are not universally available in rural unincorporated areas (Coconino County 2003). The nearest serving emergency response teams are the Mormon Lake Fire Station in Mormon Lake, the Summit Fire District, east of Flagstaff, and the Forest Service fire departments located in Flagstaff.

High-Voltage Transmission Lines

Western's proposed switchyard would intersect with two existing Western 345-kV electrical transmission lines at the far western side of the health, safety, and security evaluation area. The existing lines extend north to south and carry electricity from the Navajo Generating Station near Page, Arizona, and Glen Canyon Dam on the Colorado River to the metropolitan Phoenix area.

Existing electrical transmission lines create the potential for electrical safety hazards in the immediate vicinity of the lines and the potential for personal injury, property damage, or fire in the event of transmission tie-line fault, lightning strike, or structure collapse. Electrical transmission lines present a safety risk from electrocution, although no safety issues associated with the existing 345-kV transmission lines have been reported. Statewide, six deaths were recorded in 2008 with the Industrial Commission of Arizona as a result of contact with objects and equipment associated with electrical generation and transmission (Industrial Commission of Arizona 2008).

Potential health risks from electric and magnetic fields (EMF) associated with the existing 345-kV transmission lines are less clear. Both current and voltage are required to transmit electrical energy over a transmission tie-line. The current, a flow of electrical charge measured in amperes (A), creates a magnetic field. The voltage, the force or pressure that causes the current to flow measured in units of volts (V) or thousand volts (kV), creates an electric field. Both fields occur together whenever electricity flows, hence, the general practice of considering both as EMF exposure.

The possibility of deleterious health effects from EMF exposure has been a public concern for many years about living or spending time near high-voltage lines. The available data from hundreds of studies conducted over more than 25 years have not revealed any conclusive evidence that EMF exposure from power lines poses a hazard to animal or human health. However, while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Overhead power lines usually emit a stable EMF that fluctuates widely as current changes in response to the changing electrical load. These EMFs are highest under the transmission lines and drop off quickly as distance from the line increases (Western Area Power Administration 2005). Given the rural nature of the existing transmission tie-line rights-of-way, and the fact that no residences are located immediately adjacent to, or in the vicinity of, the existing transmission lines, no human health or safety issues associated with EMF are currently present within the health, safety, and security evaluation area.

3.10.2 Environmental Consequences

This section examines concerns for health, safety, and security of workers and the public that could arise from the construction or operation of the proposed wind park, transmission tie-line, and Western's switchyard.

3.10.2.1 Standards of Significance

The proposed project components and alternatives would have significant and adverse effect on public and occupational health, safety, and security if:

- Construction and operation of the proposed project components would result in a substantial increase in health and safety risks or serious injuries to workers, visitors to the area, or area land users.
- EMF levels would substantially increase near sensitive land uses.
- Construction, operation, and maintenance activities would impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan.
- Construction or operation of the proposed project components would cause substantial changes in traffic patterns resulting in hazardous driving conditions for motorists.
- Project implementation would violate local, State, or Federal regulations regarding handling, transport, or containment of hazardous materials.

3.10.2.2 Foresight's Proposed Project and Proposed Federal Actions

Potential public health and safety hazards are greatest during the construction phase, but they can be effectively minimized by complying with applicable Federal and State occupational safety and health standards, and with application of the RPMs listed in Section 2.7. On December 1, 2006, the Secretary of Energy issued a memorandum concerning the "Need to Consider Intentional Destructive Acts in NEPA Documents." This section of the EIS addresses the threat of "intentional destructive acts" (i.e., acts of sabotage or terrorism).

Occupational Hazards

Wind Park, Transmission Tie-line, and Switchyard Construction

In general, human health and safety concerns associated with the construction of the proposed project components include the movement of large construction vehicles and equipment and materials, falling overhead objects, falls into open excavations, and electrocution. These concerns are most relevant to construction personnel who would be working on-site.

Foresight, Western, and the Forest Service are committed to enforce the applicable health and safety practices identified in Section 2.7. Application of these RPMs would minimize occupational hazards associated with construction and would not result in a substantial increase in health and safety risks or serious injuries to workers, visitors to the area, or area land users.

Wind Park Operations and Maintenance

Operational hazards of the proposed wind park would include the possibility of tower collapse, blade failure, or ice shedding. The advancement of turbine technology has eliminated much of the potential for impacts to workers or public safety and security. Technological improvements and mandatory safety standards for turbine design, manufacturing, and installation have largely eliminated occurrences of tower collapse and blade failure. Modern utility-scale turbines are certified according to international engineering standards, which include ratings thresholds for withstanding different levels of hurricanestrength winds and other criteria. Due to the climate of northern Arizona, turbine icing would be expected to occur at times during operation. However, any ice that accumulates on the rotor blades would likely cause an imbalance or otherwise alert turbine sensors, which are designed to shut down. As the ice begins to thaw, it would typically drop straight to the ground. Any ice that remains attached to the blades as they begin to rotate could be thrown some distance from the tower; however, such a throw would usually result in the ice breaking into small pieces and falling near the tower base. For security and safety reasons, signs would be posted at the entrance of wind park access roads to alert the public and maintenance workers of potential ice shedding risks. With the advancements in turbine technology, combined with the limited number of workers and members of the public expected during the operational phase, the proposed wind park would not result in a substantial increase in health and safety risks or serious injuries to workers, visitors to the area, or area land users due to any tower collapse, blade failure, or ice shedding.

Transmission Tie-line and Switchyard Operations and Maintenance

Operation of the proposed transmission tie-line and switchyard would result in increased EMF levels in the immediate vicinity of the facilities. Public exposure to EMF specific to transmission tie-line and switchyard operation would be unlikely, however, due to the fact that no residences are located within the vicinity of the proposed facilities; the residence at the Flying M Ranch is over one-half mile from the proposed transmission tie-line, and several miles from the proposed switchyard.

Regardless, EMF created by the transmission tie-line would be reduced through the incorporation of low-EMF designs as detailed in Section 2.7. Based on these RPMs, the operation of the transmission tie-line would not substantially increase EMF levels near sensitive land uses, and significance thresholds associated with EMF would not be exceeded.

EMF would also be produced within the switchyard, but due to the spacing of electrical equipment measured field strengths would be low outside the fence line. In general, EMF close to a switchyard is produced mainly as a result of entering power lines. Western would comply with Federal and industry standards for designing and installing electrical equipment related to the switchyard. As a result, low EMF levels would result from the operation of the proposed switchyard.

<u>Public Safety and Site Security</u>

Wind Park, Transmission Tie-line, and Switchyard Construction

Potential hazards to public safety as a result of the construction of the proposed project components are generally limited to increased construction traffic (e.g., over-width, slow-moving vehicles on smaller roadways; increased vehicular traffic from construction personnel) and possible route detours and/or closures.

Public exposure to health or safety problems from general construction activities would be unlikely because of the implementation of safety regulations and plans and because the area is lightly populated with only one residence near the western boundary of the proposed wind park. Additionally, the general public would not be allowed near the proposed wind park, transmission tie-line, and switchyard construction areas.

The general public could be exposed to construction-related hazards due to the passage of large construction equipment on area roads. Increased traffic impacts during the wind park construction would most likely occur near the I-40/Meteor Crater interchange, along Meteor Crater Road and Chavez Pass Road. Transport of WTG components and other large project components via semi-trucks would vary depending on available cranes for assembly, but Foresight has indicated that, at peak construction, up to

26 semi-truck loads could be transported and unloaded within the wind park per equipment delivery day. In addition, approximately 250 to 400 workers would add traffic to local roadways as they commute to and from the work site. Approximately 315 vehicles per day use Meteor Crater Road to visit Meteor Crater, and small amounts of local traffic also use the road. Foresight would develop a traffic control plan in consultation with the Coconino County Public Works Department prior to the start of construction. This limited amount of traffic utilizing the I-40/Meteor Crater Road interchange and Meteor Crater Road, combined with the traffic control plan for the interchange and road, is not expected to cause substantial changes in traffic patterns resulting in hazardous driving conditions for motorists. Applicable significance standards to public safety from transportation related to the construction of the wind park would not be exceeded.

Increased traffic impacts for the proposed transmission tie-line and Western's proposed switchyard would occur near the Lake Mary Road/FS 125 intersection. Some restriction or temporary closure of FS 125 could also occur during the delivery of equipment and materials to the transmission tie-line right-of-way or to the proposed switchyard site. These would be intermittent and temporary, and would be managed with approved traffic control plans, which would be developed by Foresight in consultation with Coconino County Public Works Department. Thus, substantial changes in traffic patterns resulting in hazardous driving conditions for motorists would not occur.

Road detours or closures would have the potential to affect emergency services. To avoid a negative consequence, construction managers would coordinate with local fire and emergency service personnel and with land management agencies to ensure that they are aware of where various construction activities are occurring in order to avoid potential conflicts between construction activity and the provision of emergency services.

Wind Park Operations and Maintenance

Potential hazards to public safety as a result of the operations and maintenance of the proposed wind park includes wildfires and risk to pilots during low-level aerial flights. Intentional destructive acts, such as an attack of terrorism, are also considered.

The installation of WTGs and met towers would create a potential for collisions with low-flying aircraft. Safety hazards to aircraft as a result of the proposed wind park are disclosed in Section 3.9 (Transportation).

In order to minimize the risk of wildfires, the electrical components of the proposed wind park would be inspected for system and grid safety prior to being brought on line. This inspection, along with implementation of built-in safety systems, minimizes the chance of fire occurring. However, fire at these facilities could result from a lightning strike, short circuit, or mechanical failure/malfunction. The SCADA system would sense any of the above occurrences and report to the wind park control center. Such a centralized system would monitor the condition of the wind park's equipment, alert service technicians to any fault or alarm conditions, and automatically shut down equipment, as necessary.

Generally, any fire or other emergency situations at a WTG site, step-up substation, or other wind park facility that are beyond the capabilities of the local service providers would be the responsibility of the facility operator. Construction and maintenance personnel would be trained and have the equipment to deal with emergency situations that could occur at these facilities; therefore, such an incident would generally not expose local emergency service providers or the general public to any public health or safety risk. Furthermore, the Emergency Response Plan developed for the wind park and transmission tie-line would contain emergency fire precautions, notification procedures, and emergency response sequences; comply with standards published by the National Fire Protection Association; and be reviewed and approved by the Coconino County Fire Marshall prior to issuance of a building permit for the wind generating facility.

To reduce safety and security concerns during operations and maintenance, public access to the proposed wind park would be limited by the terms and conditions established by affected land owners and management agencies. If granted by the landowner and the wind park owner/operator, the public could have a right of access over portions of the wind park on which the wind turbines and other wind facility components are located. There is no plan to gate the entire wind park, although access to, and within, the wind park site could be controlled. It is expected that signs would be posted at the wind park to warn of the potential hazards associated with the wind park, but the public would still have access to these areas for dispersed recreation. Year-round access to the wind park would be maintained so operators can monitor the facilities and equipment and quickly respond to any unforeseen condition that might impact the safety of the operations staff or the public.

Certain wind park facilities, including the step-up substations at the wind park site and the O&M facility, would be fenced with warning signs and have security lighting. The wind park is designed in such a way, as described in Chapter 2, to reduce potential sabotage and terrorism-related impacts. Some of these design characteristics include fencing at the switchyard and step-up substations and warning signs on locks and equipment. Western and the Forest Service believe that the wind park presents an unlikely target for an act of terrorism, with an extremely low probability of attack. The potential for the wind park to be targeted in terrorism-related activity would be negligible. All authorized personnel would be issued specific keys and/or access codes to regulate entry into wind park facilities, including the step-up substations, O&M facility, and individual WTGs. These measures would limit access and deter intruders.

Transmission Tie-line and Switchyard Operations and Maintenance

The proposed transmission tie-line would include towers less than 200-feet tall. Likewise, Western's proposed switchyard would include a communications tower and several new transmission structures that would be less than 200-feet tall. Safety hazards to aircraft as a result of the proposed transmission tie-line and Western switchyard are disclosed in Section 3.9 (Transportation).

In order to minimize the risk of wildfires, the electrical components of the proposed transmission tie-line and Western's proposed switchyard would be inspected for system and grid safety prior to being brought on line. This inspection, along with implementation of built-in safety systems, minimizes the chance of fire occurring. However, fire at these facilities could result from a lightning strike, short circuit, or mechanical failure/malfunction. Western's proposed switchyard would be monitored and controlled from Western's control center through its SCADA system. The system would respond to any condition that could cause fire-related hazards.

The proposed transmission tie-line right-of-way would not be fenced, but public vehicle access along the right-of-way could be controlled or restricted on Forest Service-managed lands if illegal use becomes an issue. Western's proposed switchyard would be fenced with a locked gate and posted with signs. Access to the switchyard would only be for Western employees and approved contractors. Western and the Forest Service believe that the proposed transmission tie-line and switchyard present an unlikely target for an act of terrorism, with an extremely low probability of attack. The potential for the transmission tie-line or switchyard to be targeted in terrorism-related activity would be negligible.

Environmental Hazards

Wind Park, Transmission Tie-line, and Switchyard Construction

Chemicals or other potentially hazardous materials used during construction would include diesel fuel, lubricants, and hydraulic fluids. These hazardous materials are used for operating construction equipment and are transported in small amounts, making public or environmental exposure unlikely and limited in severity. Implementation of RPMs identified in Section 2.7 would ensure applicable spill and hazardous waste requirements are met and significance standards would not be exceeded.

Wind Park, Transmission Tie-line, and Switchyard Operations and Maintenance

Western's proposed switchyard and the proposed step-up substations would include transformers with oil. Implementation of RPMs identified in Section 2.7 would ensure applicable spill and hazardous waste requirements are met and significance standards would not be exceeded. If required, secondary containment would be installed within the switchyard to prevent the migration of oil from the switchyard site.

3.10.2.3 Alternative Transmission Tie-line Corridor

Health, safety, and security impacts associated with construction and operation of the alternative transmission tie-line would be the same as those described for the proposed transmission tie-line.

3.10.2.4 No Action Alternative

The No Action Alternative would result in no new impacts to human health, safety, and security because under this alternative, Western would not approve an interconnection for the Grapevine Canyon Wind Project and the Forest Service would not issue a permit for the transmission tie-line proposed for the wind park. The wind park, transmission tie-line, and switchyard would not be constructed.

3.11 NOISE

3.11.1 Affected Environment

3.11.1.1 Resource Evaluation Area

The resource evaluation area for noise impacts conservatively included an area up to one mile from the wind park study area, transmission tie-line, interconnection switchyard, and primary access roads, to incorporate any nearby sensitive receptors such as residences, schools, businesses, or public buildings.

3.11.1.2 Characterization

Fundamentals of Sound and Noise

People perceive sounds through sensations in the ear that are caused by pressure variations. Sounds can be distinguished by a loudness (sound pressure) component, measured in decibels, and a frequency component, measured in Hertz. Sound travels through the air as waves of air pressure fluctuations caused by vibration. Because energy contained in a sound wave is spread over an increasing area as it travels away from the source, loudness decreases with distance.

A decibel (dB) is the unit used to describe the amplitude of sound. Sound level measurements that are weighted to how humans perceive them are called A-weighted and are denoted by the unit dBA. The dBA scale reflects the response of the human ear by filtering out some of the noise in the low and high frequency ranges that the ear does not detect well. The primary assumption is that the dBA is a good correlation to a human's subjective reaction to noise. The A-weighted scale is used in most noise ordinances and standards. The dBA scale is logarithmic; therefore, individual dBA ratings for different sources can not be added directly to calculate the sound level for combined sources. For example, two sources, each producing 50 dBA would, when added logarithmically, produce a combined sound level of 53 dBA. In general, a 3-dBA increase in sound level is considered barely noticeable to humans; a 5-dBA increase is clearly noticeable, and a 10-dBA increase is considered a doubling of the sound level.

One of the most common ways of describing noise levels is in terms of the continuous equivalent sound level (Leq) over a monitoring period. Leq is the most commonly used descriptor in noise standards and regulations. The Leq is defined as the average noise level for a stated period of time (such as hourly or daily). The one-hour Leq is noted as Leq (1); the Leq over 24 hours is written as Leq (24). The Leq is weighted because loud and infrequent noises have a greater effect on the resulting level than quieter, more frequent noises. The Leq tends to weight the higher sound levels. The 24-hour Leq with a 10 dBA "penalty" for the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. is known as Ldn (day-night noise level). The Ldn attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.

Noise Standards

There are no Federal or State noise standards that regulate wind parks, nor does Coconino County have local regulations or ordinances for noise. The EPA has, however, developed guidelines for evaluating noise impacts that are generally accepted and used in noise analyses (EPA 1974). As a standard for residences and other noise-sensitive receptors, the EPA recommends a Ldn of 65 dBA, or 55 dBA (Leq) averaged over 1 and 24 hour periods.

Noise Sensitive Receptors and Background Conditions

The noise evaluation area is generally rural and undeveloped with few, and widely scattered, residences (refer to Figure 3.1-4 for map of existing land uses). The only residence in the vicinity of the noise evaluation area is part of the Flying M Ranch, located near the wind park study area's western boundary, off of FS 126. Flying M Ranch consists of a primary residence and numerous other structures located approximately 350 feet west of the wind park study area boundary. This ranch consists of historic homesteads which date back as early as 1914, located on private and State-leased lands (Diablo Canyon Trust 2011). Structures associated with the Raymond Ranch Wildlife Area are located just over one mile north of the wind park study area. No other residence, school, business, or public building is found within one mile of the noise evaluation area. Other land uses in the area include dispersed recreation and camping, which occur primarily near Pine Hill on Anderson Mesa, within one mile of the proposed transmission tie-line and switchyard.

Baseline noise measurements were not conducted for this EIS. For assessment purposes, the baseline noise levels were assumed to be similar to those outlined by EPA for common noise sources (Table 3.11-1). The rural nature of the area would correlate to average noise levels in the 40 to 50 dBA range. Ambient noise in rural areas is commonly made up of rustling vegetation, ranching activities, airplanes, and infrequent vehicle pass-bys. Higher ambient noise levels, typically 60 to 65 dBA, could exist near the Meteor Crater Visitor Center as a result of vehicle traffic and tourism activities. Table 3.11-1 depicts noise levels associated with common everyday sources, and is provided here as context for interpreting the magnitude of noise levels discussed in this EIS.

TABLE 3.11-1 COMMON NOISE SOURCES AND LEVELS			
Noise Source	**Average Noise (dBA)**	**Loudness (relative to normal conversation = 1)**	**Range of Noise (dBA)**
Ambulance siren (100 feet)	100	16	95–105
Motorcycle (25 feet)	90	8	85–95
Typical construction site	85	6	80–90
Single truck (25 feet)	80	4	75–85
Urban shopping center	70	2	65–75
Single car (25 feet)	65	1.5	60–70
Within 100 feet of a highway	60	1	55–65
Normal conversation (5 feet apart)	60	1	57–63
Residential area during day	50	0.5	47–53
Recreational area	45	0.4	40–50
Residential area at night	40	0.3	37–43
Rural area during day	40	0.3	37–43
Rural area at night	35	0.2	32–37
Quiet whisper	30	0.1	27–33
Threshold of hearing	20	0.06	17–23
Source: EPA 1974			

3.11.2 Environmental Consequences

3.11.2.1 Standards of Significance

The effects of noise on people fall into three general categories: 1) subjective effects of annoyance, nuisance, and dissatisfaction; 2) interference with such activities as speech, sleep, and learning; and 3) physiological effects such as startling and hearing loss. In most cases, environmental noise produces effects in the first category only. However, residents who live close to roads and industrial facilities could experience noise effects in the second and third category.

A significant effect from noise would occur if project implementation would result in:

- Exceeding the EPA guidelines recommending a day-night average sound level of 65 dBA (Ldn) or 55 dBA averaged over 1 and 24 hour periods for sensitive receptors.

3.11.2.2 Foresight's Proposed Project and Proposed Federal Actions

This section evaluates potential noise impacts that could result from construction, operation, and maintenance of the proposed wind park, transmission tie-line, and switchyard.

Construction

Noise levels associated with construction of a wind park, transmission tie-line, and switchyard would vary greatly depending on the type of equipment, construction schedule, and condition of the area being worked. Construction activities would primarily be limited to daytime hours; nighttime construction activities within the wind park study area and along the transmission tie-line would only occur with approval of the land management agencies or landowners. All construction activities would occur within the boundaries of the wind park study area, along new access roads, within the 200-foot-wide right-of-way, along proposed spur roads for the transmission tie-line, and within the proposed staging and footprint areas for Western's proposed switchyard and new dead-end structures.

Noise would also be generated from vehicle traffic. On-site vehicular traffic would include hauling of materials in and out of the construction site, movement of heavy equipment, and worker traffic. Construction and worker vehicle access to the proposed project components would occur along the proposed primary wind park access road (located off of Meteor Crater Road), Chavez Pass Road, and FS 125. To access these roads, however, construction vehicles could be traveling over interstate, regional, and local roads as well. The number of truck trips associated with construction would vary, depending on the construction stage, but overall the total traffic volume along local roads would increase during high activity periods of the construction phase. Noise increases would be common during the construction phase along the primary wind park access roads.

Activities associated with site development, transportation, construction, equipment installation, and startup and testing would emit noise during the hours of on-site activity. Table 3.11-2 presents noise levels of various types of construction equipment and activities at distances of 50 feet, 500 feet, and 1,500 feet.

TABLE 3.11-2
NOISE LEVELS FROM POTENTIAL CONSTRUCTION EQUIPMENT AT VARIOUS DISTANCES

Construction Equipment	**Typical Sound Pressure at 50 Feet (dBA)**	**Typical Sound Pressure at 500 Feet (dBA)**	**Typical Sound Pressure at 1,500 Feet (dBA)**
Dozer (250-700 hp)	88	68	58
Front end loader (6-15 cu. yards)	88	68	58
Trucks (200-400 hp)	86	66	56
Grader (13 to 16 ft. blade)	85	65	55
Shovels (2-5 cu. yards)	84	64	54
Portable generators (50-200 kW)	84	64	54
Derrick crane (11-20 tons)	83	63	53
Mobile crane (11-20 tons)	83	63	53
Concrete pumps (30-150 cu. yards)	81	61	51
Tractor (3/4 to 2 cu. yards)	80	60	50
Concrete batch plant	83	n/a	n/a

Source: EPA 1971; Barnes et al. 1976; FHWA 2006.

Wind Park

Construction of the proposed wind park would include the following noise-generating activities over the planned 12 to 18 month construction period for each 250 MW phase.

- Site and right-of-way clearing
- Access road construction
- Vehicle movement
- Concrete batch plant operation
- Rock crushing
- Blasting
- Foundation excavation and construction

- Wind turbine structure erection
- Underground electrical collection system installation
- Substation installation
- Site cleanup and restoration

Construction noise levels would be variable and intermittent, as equipment is operated on an as-needed basis. Construction equipment would move from one WTG site to the next, so construction noise levels would not dominate one area, except for the operation of the proposed batch plant. The batch plant and other stationary construction equipment would be sited a minimum of one-half mile from residential structures. Infrequent blasting activities could occur at the borrow pits or associated with construction of the WTG foundations. If blasting activities are necessary, they would be limited in nature and would be conducted in strict compliance with safety and public notification/warning requirements, and in accordance with applicable Federal and State regulations. The primary access route to the wind park extends southwest from Meteor Crater Road into the wind park study area. Service roads specific to the construction of the wind park would be built in conjunction with the WTGs and collector system and would not be located within one-half mile of any sensitive receptors. Potential noise impacts would be greatest at the highest number of peak-hour trips and total heavy-duty truck trips. Construction workers in light-duty vehicles would typically travel to the site during the morning and afternoon.

Construction activities normally would be limited to daytime hours and thus would not impact existing background noise levels at night. Construction activities within the wind park would only occur during nighttime with approval of the land management agencies or landowners. At one mile, construction related noise during the day, and at night if construction activities are requested and approved, would be comparable to that of background levels in the area.

The only noise-sensitive receptors in the general vicinity of the proposed wind park include the residents of the Flying M Ranch (near the western boundary of the wind park study area) and the Raymond Ranch Wildlife Area (north of the wind park study area). Because both of these areas are located outside of the wind park study area and construction activities associated with the wind park facilities would be located more than one-half mile from residences, noise from construction is expected to be minimal. If it is determined that blasting would be required within one mile of the Flying M Ranch, the owner would be notified. No other features of the wind park, including the staging areas, batch plant, rock crusher, or substation would be located in the vicinity of any residential buildings or other sensitive receptors. No construction equipment traffic associated with the wind park is expected to enter the wind park study area through FS 126 which passes within several hundred feet of the Flying M Ranch Winter headquarters.

Construction workers would be protected from adverse noise effects by equipment and procedures dictated by law and project construction specifications. Due to the intermittent and temporary nature of noise impacts of wind park construction and the distance to sensitive receptors, noise levels are not expected to exceed the EPA guidelines recommending a day-night average sound level of 65 dBA (Ldn) or 55 dBA for sensitive receptors. Significance standards related to noise from the construction of the proposed wind park would not be exceeded.

Transmission Tie-line and Switchyard

Construction of the transmission tie-line would occur over several months, but noise-generating activities would be intermittent. Noise impacts specific to the construction of the transmission tie-line would result from heavy construction equipment and trucks used along the access roads and right-of-way. Construction equipment would move from one structure site to the next, so construction noise levels would not dominate one area. Blasting with explosives could be used as needed for the structure foundations, based on local geologic conditions. Relatively high peak noise levels in the range of 83 to 88 dBA would occur within 50 feet of the transmission tie-line structure sites and the proposed switchyard. While not anticipated, difficult terrain along the slopes of Anderson Mesa could require some structures and/or conductors to be installed via helicopter. For potential transmission tie-line structure sites where workers or equipment would be delivered by helicopter or sky crane, the approach, landing, and takeoff would be an additional noise source. Noise from medium-lift helicopters typical of those that would be used is in the range of 90 to 100 dBA at 50 to 100 feet (FAA 2004). If helicopter construction is required, helicopter staging areas would be sited a minimum of one mile from residences. Construction access for the transmission tie-line would likely be FS 125 from Lake Mary Road. In eastern sections of the proposed transmission tie-line alignment where FS 125 deviates from the transmission tie-line alignment, a new access road or spur roads would be constructed to or within the 200-foot transmission tie-line right-of-way.

With the exception of the Flying M Ranch, which is approximately 2,000 feet at its nearest point from the proposed transmission tie-line, no other receptors are located within one mile of the proposed transmission tie-line or switchyard. Ranch residents are likely to experience intermittent peak noise levels above ambient conditions, but due to the distance from noise sources, noise levels are not expected to exceed the EPA guidelines recommending a day-night average sound level of 65 dBA (Ldn) or 55 dBA for sensitive receptors. Significance thresholds related to noise impacts from the construction of the proposed transmission tie-line would not be exceeded.

Construction of the proposed switchyard would occur over approximately seven months, but noise-generating activities would be intermittent and limited to the operation of construction equipment. Construction access for the proposed switchyard would be from FS 125 from Lake Mary Road. There are no residential structures or sensitive noise receptors near Western’s proposed switchyard site. Therefore, noise levels from construction would not lead to impacts to sensitive receptors, and significance thresholds for noise would not be met.

The majority of the transmission tie-line and Western’s switchyard are proposed on Forest Service-managed lands where recreational uses are intermittent and temporary. Noise impacts to recreationists would most likely be limited to those camping, hiking, hunting, or conducting other forms of dispersed recreation in the vicinity of Pine Hill, near the western end of the transmission tie-line alignment and the proposed switchyard. Construction activities normally would be limited to daytime hours and, thus, would not impact existing background noise levels at night. Construction activities would only occur during night-time hours with approval of the Forest Service. Due to the dispersed nature of recreational activities, it is expected recreationists would pick sites away from areas subject to noise increases from the construction of the proposed transmission tie-line and Western’s proposed switchyard.

Operation and Maintenance

Wind Park

Noise-producing components of the wind park during operation and maintenance include the wind turbines, the transformer at the step-up substations, and intermittent vehicle traffic.

WTGs emit perceptible noise when in motion, emanating from the aerodynamic and mechanical functions of each turbine. A turbine’s sound power represents the sound energy at the center of the blades, which propagates outward at the height of the hub. Mechanical noise is generated by the turbine’s internal gears. Utility scale turbines are usually insulated to prevent mechanical noise from proliferating outside the nacelle or tower (Alberts 2005). Aerodynamic noise is generated by the blades passing through the air. The power of aerodynamic noise is related to the ratio of the blade tip speed to wind speed. Noise levels can vary depending on wind speed and distance of the listener from the turbine. Noise levels would be higher on windy days; there are some circumstances in Winter where ice can form on a wind turbine blade, creating temporarily higher levels of turbulence noise.

Foresight anticipates that the Vestas V100 1.8 MW turbine would be one of the turbines considered for the project. The Vestas V100 brochure (Vestas 2009) indicates that the sound power for this type of turbine would be between 95–107 dBA, which is similar to other 2.0 MW class turbines. Alberts (2005) has measured noise levels at the base of a similar Vestas structure at 58 to 60 dBA.

Most modern industrial wind turbines are designed to keep noise levels at or below 45dB at 1,000 feet, which should drop to 35 to 40dB at a bit over one-half mile (Acoustic Ecology Institute 2007), which is generally consistent with typical night-time ambient noise levels in rural areas. In the U.S., wind facilities often have setbacks to minimize the potential impacts from nearby residents. According to Acoustic Ecology Institute (2007), a one-half mile setback is acceptable if the goal is to minimize impacts on residents, though preference is for a one mile setback, which would offer near assurance of avoiding or minimizing noise issues. The closest residence to the proposed wind park, at Flying M Ranch, is located approximately 350 feet west of the wind park study area boundary. The nearest proposed turbine, however, is expected to be located more than one-half mile away. As a result, noise levels from the operation of the turbines, including routine maintenance, would be minimal for the residents of the ranch, and is not expected to exceed the EPA guidelines recommending a day-night average sound level of 65 dBA (Ldn) or 55 dBA.

Electricity generated by the turbines would be collected by a network of underground and overhead 34.5-kV collection lines and delivered to the wind park's step-up substations. The new step-up substations would include a transformer to step up the voltage of the collection grid from 34.5-kV to 345-kV in order to connect to Western's 345-kV transmission system. This transformer is expected to be the major source of audible noise. The predominant noise from a transformer is a hum, which is approximately 85 dBA. Although electrical equipment has not been specified for the proposed step-up substations, transformer noise emissions would be subject to National Electrical Manufacturers Association (NEMA) standards and, therefore, would be typical for the industry.

The step-up substations and transformers would be located greater than one-half mile away from sensitive receptors and would not negatively affect them. Occasional noise from routine maintenance at the step-up substations would create traffic noise, but not at levels that is expected to exceed the EPA guidelines recommending a day-night average sound level of 65 dBA (Ldn) or 55 dBA for sensitive receptors.

Transmission Tie-line and Switchyard

Audible noise associated with transmission lines is a result of corona discharge and is a function of line voltage. The amount of audible noise is directly related to the level of corona activity, which in turn is affected by the conductor's physical condition and contamination as well as meteorological conditions, most notably rain. Transmission line audible noise is characterized by cracking, frying, sputtering, and low frequency tones, which are best described as humming sounds. Audible noise from transmission lines primarily occur during foul weather conditions. Audible noise increases during dust storms or rain events, although it is generally masked by the background noise of rain and wind. In dry fair weather conditions, the conductors operate below the corona-inception level, and noise effects typically do not extend beyond the right-of-way. Because there are no permanent noise receptors located closer than 2,000 feet from the proposed transmission line, corona noise would dissipate with distance and no impacts would be expected.

The proposed switchyard would also generate noise during operation as a result of corona and occasionally disconnect switches and circuit breakers operations which create momentary noise. The switchyard facilities would also be subject to NEMA noise standards. Because of its remote location, noise generated at the switchyard would not impact any sensitive noise receptors. Due to the dispersed nature of recreational activities, it is expected recreationists would pick sites away from the switchyard to conduct recreational activity. However, operational noise of the switchyard would dissipate with distance and is not expected to be heard at 2,000 feet and beyond except for an occasional trip of a circuit breaker due to a transmission line fault.

Occasional maintenance activities on the proposed transmission line and switchyard would be required. Noise impacts from these activities would be intermittent and applicable significance thresholds would not be exceeded.

3.11.2.3 Alternative Transmission Tie-line Corridor

The alternative transmission tie-line alignment would not result in additional noise impacts from that described under the proposed transmission tie-line. The location of the alternative alignment is within one-half mile of the proposed alignment, and no residents or other receptors are located in the area. As a result, noise impacts would be similar to those described under Foresight's proposed transmission tie-line alignment.

3.11.2.4 No Action Alternative

Under the No Action Alternative, the proposed project components would not be constructed or operated. Potential noise impacts associated with the construction and operation would not occur. The local noise conditions would continue according to current patterns and the impacts described for the proposed project components would not occur.

3.12 VISUAL RESOURCES

3.12.1 Affected Environment

3.12.1.1 Resource Evaluation Area

The evaluation area for visual resources extends three miles in all directions from the wind park study area and extends north to I-40. In addition, the visual resources evaluation area extends one mile to either side of the proposed transmission tie-line and Western's proposed switchyard. The visual resources evaluation area was selected based on the scale and geographic extent of the proposed project components. This evaluation area was determined in an effort to include areas where the proposed project would be visible to the highest number of viewers, the most prolonged views, and areas where concern for views is considered high. Additionally, the visual resources evaluation area was refined to eliminate areas beyond which the discernible details of the proposed project components begin to vanish.

Visual resources were evaluated through research of existing documents including the Forest Plan, Coconino County Comprehensive Plan, and the Diablo Canyon RPA. Further, information was gathered through aerial photography, geographic information system (GIS) analysis, and a site visit.

The analysis for visual resources was based on the methods outlined in the Scenery Management System (SMS) used by the Forest Service. The wind park study area is not located on Forest Service-managed lands and is not subject to the management objectives of the SMS. The proposed transmission tie-line and Western switchyard are located on Forest Service-managed lands and are subject to the SMS. To be consistent, the SMS was used throughout the proposed project to evaluate the expected visual change in the existing setting.

The SMS was introduced in 1995 and replaced the Visual Management System (VMS). Although one of the specific goals of the Forest Plan is to transition from the VMS to the SMS, it has not yet occurred. The Forest Service is required to begin using SMS to replace concepts and terminology of the VMS used during the Forest planning process. The major difference between the two systems is a more complete discussion of the “Landscape Character” with SMS. The SMS involves characterization and grading of the landscape related to visual resources, and establishment of objectives to ensure that Forest Service decisions are in harmony with the desired visual setting. Because the Forest Plan was completed prior to the introduction of the SMS, it uses terminology from the VMS. In order to be consistent with the Forest Plan, terminology as it relates to Visual Quality Objectives (VQOs) comes from the VMS. The SMS equivalent of a VQO is a Scenic Integrity Level (SIL).

A worksheet translating the language used between the two systems is included as Figure 3.12-1. The SILs (categories from SMS) range over five levels of integrity from very high to very low and are shown on the left side of the worksheet. Corresponding levels of VQOs (categories from VMS) are shown on the right side of the worksheet.

FIGURE 3.12-1

SCENERY MANAGEMENT SYSTEM **Scenic Integrity Levels**		**VISUAL MANAGEMENT SYSTEM** **Visual Quality Objectives**
VERY HIGH	(unaltered)	PRESERVATION

Very High scenic integrity refers to landscapes where the valued landscape character "is" intact with only minute if any deviations. The existing landscape character and sense of place is expressed at the highest possible level.

HIGH	(appears unaltered)	RETENTION

High scenic integrity refers to landscapes where the valued landscape character "appears" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.

MODERATE	(slightly altered)	PARTIAL RETENTION

Moderate scenic integrity refers to landscapes where the valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.

LOW	(moderately altered)	MODIFICATION

Low scenic integrity refers to landscapes where the valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed but compatible or complimentary to the character within.

VERY LOW	(heavily altered)	MAXIMUM MODIFICATION

Very Low scenic integrity refers to landscapes where the valued landscape character "appears heavily altered." Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles within or outside the landscape being viewed. However, deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.

Unacceptably Low scenic integrity refers to landscapes where the valued landscape character being viewed appears extremely altered. Deviations are extremely dominant and borrow little if any form, line, color, texture, pattern or scale from the landscape character. Landscapes at this level of integrity need rehabilitation. This level should only be used to inventory existing integrity. It must not be used as a management objective.

Source: Forest Service 1995b

3.12.1.2 Characterization

Management Guidelines

The Forest Service generally manages all of the lands within the visual resources evaluation area along the western border of the wind park study area and along the proposed transmission tie-line and switchyard. The Forest Service's VQOs were established in the current Forest Plan and have been used since then to guide management decisions on the Forest. VQOs of Partial Retention, Modification, and

Maximum Modification are located within the visual resources evaluation area (Figure 3.12-2). Each objective is described below as presented in the VMS.

- *Partial Retention* refers to landscapes where the valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.
- *Modification* refers to landscapes where the valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles outside the landscape being viewed. They should not only appear as valued character outside the landscape being viewed, but compatible or complimentary to the character within.
- *Maximum Modification* refers to landscapes where the valued landscape character "appears heavily altered." Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles within or outside the landscape being viewed. However, deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.

The goal of the Coconino County Comprehensive Plan, as documented in the Diablo Canyon RPA, is to "facilitate the development of alternative energy projects while maintaining the integrity of the ranches and preserving aesthetics and views." In order to accomplish this goal, two policies are set forth in the Diablo Canyon RPA (Coconino County 2005).

1. Wind projects shall be located at least one mile from major travel corridors, such as I-40 and SR 87.
2. To the extent allowed by the FAA, there shall be a minimum number of lights on the tops of the towers.

Views from major travel corridors of expressed concern include those toward the San Francisco Peaks, the Hopi Mesas, and Anderson Mesa.

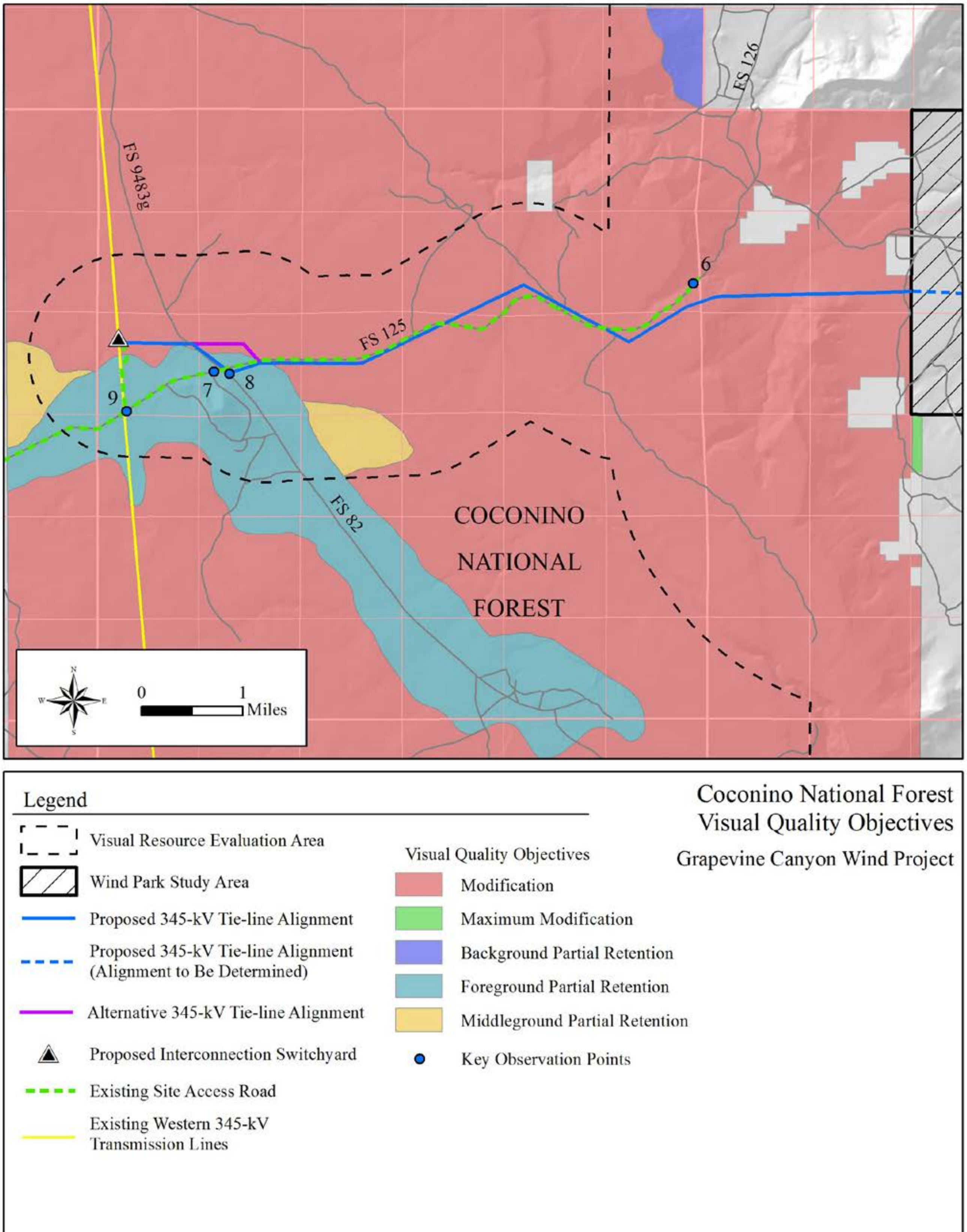

FS 9483g
FS 126
6
FS 125
7
8
9
FS 82
COCONINO
NATIONAL
FOREST
0
1
Miles
Legend
Visual Resource Evaluation Area
Wind Park Study Area
Proposed 345-kV Tie-line Alignment
Proposed 345-kV Tie-line Alignment (Alignment to Be Determined)
Alternative 345-kV Tie-line Alignment
Proposed Interconnection Switchyard
Existing Site Access Road
Existing Western 345-kV Transmission Lines
Visual Quality Objectives
Modification
Maximum Modification
Background Partial Retention
Foreground Partial Retention
Middleground Partial Retention
Key Observation Points
Coconino National Forest
Visual Quality Objectives
Grapevine Canyon Wind Project

FIGURE 3.12-2

Regional Landscape Character

The project region is located within the transition zone between the Arizona/New Mexico Plateau Ecoregion, which covers much of northern Arizona and northwestern New Mexico. Elevations generally range between 5,500–7,250 feet. The region is fairly level; however, scattered mesas provide variety to the landscape. Anderson Mesa, a geographically delineating feature, creates a drastic rise in topography near the western edge of the proposed wind park, while the Mogollon Rim drops off the edge of the Colorado Plateau south of the proposed wind park.

The highest elevation in the region rises to over 12,000 feet, forming the San Francisco Peaks. The San Francisco Peaks are located northwest of the wind park study area and form one of the most attractive and unique visual elements within Coconino County as well as the Forest. The peaks are the remains of an extinct volcano and rise abruptly from the otherwise flat plateau, creating a regional landmark visible from great distances.

Vegetative communities of the region consist of Great Basin shrublands and grasslands in the lower elevations. The vegetation within the lower and mid elevations consists of pinyon-juniper and oak. Vegetation at higher elevations consists primarily of dense ponderosa pine forests.

The area around the Mogollon Rim is considered a destination area for outdoor recreation and is an area that provides climatic relief from Summer temperatures in the Phoenix and Tucson metropolitan areas. The distinct pine forests offer a wide variety of activities associated with scenic viewing, including photography, hiking, mountain biking, OHV use, picnicking, horseback riding, big game hunting, fishing, camping, wildlife, and recreational driving.

Visual Resource Evaluation Area Landscape Character

The majority of the visual resource evaluation area is located on a semi flat valley floor. The valley opens to the north with sweeping hills. The valley is bound on the south and west by Anderson Mesa/Chavez Mountain and is loosely bound by Sunset Mountain and Meteor Crater to the east. A few scattered ranching residences are located in the vicinity and the major land use is ranching. The overall character of the valley is naturally evolving, meaning “the landscape character expresses the natural evolution of biophysical features and processes, with very limited human intervention” (Forest Service 1995b). A few unimproved dirt roads cross through the area. The nearest major roads are I-40 to the north and SR 87 to the south. Local vegetation varies with elevation and aspect, but ranges between sparse vegetation and grasslands in the lower elevations, to dense pinyon-juniper woodlands at the edge of the mesa, to scattered ponderosa pine forests and grasslands in the higher elevations on top of Anderson Mesa. Figures 3.12-3, -4, and -5 generally illustrate the vegetation types and landscape character of the evaluation area.

Water is often a factor in evaluating landscape character. It is often considered an amenity to visual resources. Several perennial bodies of water, including Kinnikinick Lake, are located just outside of the visual resources evaluation area. Water within the visual resources evaluation area is limited to ephemeral streams or creeks, stock watering ponds, and watering tanks. However, over time water has created distinct landscape features that are apparent throughout the visual resources evaluation area in the form of canyons and draws. Three distinct drainages (Canyon Diablo, Grapevine Canyon, and Jack’s Canyon) traverse the visual resources evaluation area, and in addition to Anderson Mesa, are the most evident landscape features. Canyon Diablo and Grapevine Canyon are the two most evident canyons in the area, but generally do not have flowing water.

FIGURE 3.12-3

Sparse vegetation and grasslands dominate the lower elevations. This photograph is looking west, from the rim of Meteor Crater, across the northern end of the visual resources evaluation area.

FIGURE 3.12-4

Dense pinyon-juniper woodlands at the transitional edge of Anderson Mesa and the lower elevations. This photograph is looking north from the southern end of the visual resources evaluation area.

FIGURE 3.12-5

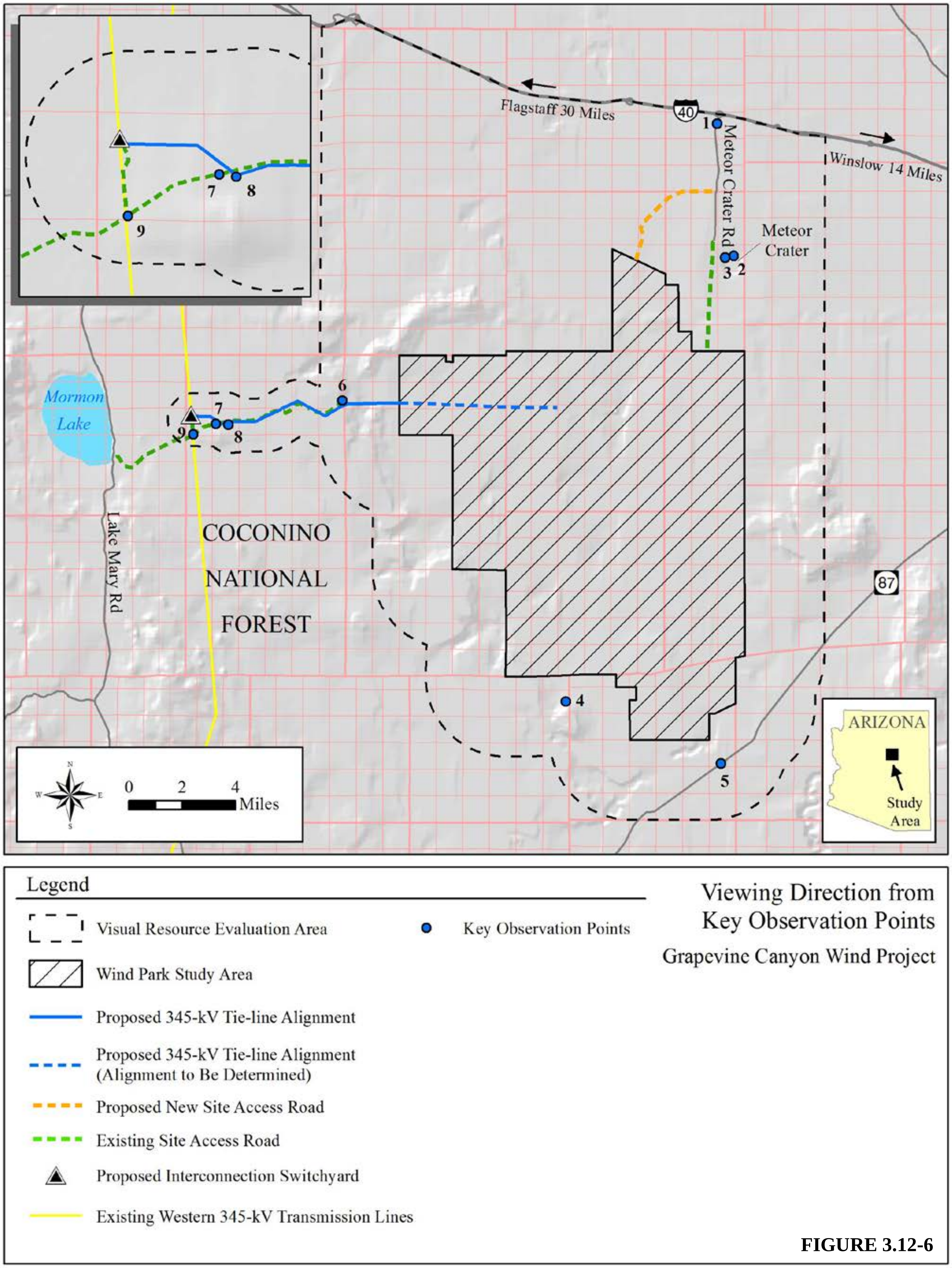
Typical higher elevations above Anderson Mesa. The photograph illustrates scattered ponderosa pine forests and grasslands that are typical in the higher elevations of the visual resources evaluation area for the tie-line.

Meteor Crater, a National Natural Landmark designated by the National Park Service (NPS), is located within the visual resources evaluation area. The crater was formed when a meteorite impacted the site approximately 50,000 years ago. The site is a popular tourist stop, with a visitor's center and guided tour around the rim of the crater. The crater is privately owned and operated. With the exception of the designation, there is no affiliation with NPS, and NPS does not manage the site or surrounding area for visual resources.

Key Observation Points

To assess visual impacts from the proposed wind park, proposed transmission tie-line, and Western switchyard, the most critical viewpoints were selected, known as key observation points (KOPs). KOPs were identified by the NEPA Interdisciplinary (ID) Team based on landscape visibility, including: 1) travelways and use areas; 2) viewer concern levels; 3) distance zones; 4) number of viewers; and 5) length of view (time duration). KOPs typically depict prominent or sensitive views. Nine KOPs were identified at the beginning of the visual analysis and are depicted in Figure 3.12-6.

The existing landscape character as seen from each of the KOPs is described below. The first five KOPs are located on private and State trust land. The remaining KOPs are located on National Forest System lands.



Viewing Direction from Key Observation Points

Grapevine Canyon Wind Project

FIGURE 3.12-6

KOP 1 – Interstate-40

This viewpoint looks from the southeast to the southwest near the turnoff from I-40 and Meteor Crater Road. This KOP is the closest and most heavily traveled area near the wind park study area. Typical speeds along I-40 exceed 55 miles per hour (mph). This turnoff is one of only a few stops along this stretch of I-40 and receives many visitors traveling to Meteor Crater, or the Meteor Crater gas station, convenience store, and RV park. There are few aesthetic elements when looking in this southern direction. The landscape lacks form, has very few lines, and at the season when the site visit occurred, lacked any hues and was monotone. In addition, the textures are very fine and evenly distributed. The viewer's attention is drawn across the rolling hills in the foreground, across the flat valley floor toward the rim of Anderson Mesa in the background. The landscape has rolling hills with low growing vegetation, and there are minimal disturbances to the existing views. There are no distinct elements in the view, and the landscape is indistinctive.

KOP 2 – Meteor Crater Visitor Center Patio Window

This viewpoint looks from the west to the north from the Meteor Crater Visitor's Center at what is described as the "Patio Window." This window is a focal point for tourists visiting Meteor Crater. The window, located on the patio level or courtyard of the visitor center, is oriented to the northwest and frames a view of the San Francisco Peaks. Views from within the courtyard are constrained by walls and topography except from this viewing window. The view is slightly elevated above the mostly flat valley floor. The distinct peaks create an aesthetically pleasing contrast to the flat open valley. The conical shapes of the peaks create dominance and draw attention. The sweeping curves of the road to Meteor Crater create contrast in the otherwise open plains. The elevated view creates a more pleasing view of the open grasslands across the plain. The color harmony is rich within the yellows, browns, and tans.

KOP 3 – Meteor Crater Rim

This view looks from the southwest to the northwest from the rim of Meteor Crater. Aside from the crater, there are few visually enticing elements in the landscape and minimal disturbances to the landscape from this viewpoint. The area is mostly rural and natural. This KOP is located along an approximate one-half mile guided hike that occurs daily, weather permitting. This KOP is located at one of several planned stops along the tour. From this location the guide directs visitors to look to the west and points to Canyon Diablo in reference to the location where several meteorites were discovered. This viewpoint has open views of the valley toward the north, but views are blocked to the south by the crater itself. The elevated view reiterates the lack of vegetation and water. The indistinctive landscape character offers little-to-no attraction to the viewer from this location. Colors are monotone, there are very few lines to create variations, and there are few forms. The mesa across the valley to the west is mostly flat with few prominent peaks.

KOP 4 – Chavez Pass

This view looks north from an area near the southern end of the visual resources evaluation area known as Chavez Pass. Chavez Pass rises several hundred feet toward the south end of the valley, between Chavez Mountain and Anderson Mesa. Chavez Pass Road travels through the pass, and this KOP is located on that road. Views along this section of road are expansive to the north and east. Vegetation in this area is taller and consists of junipers, sages, and grasses. There are minimal disturbances to the existing views. There are few apparent alterations in the area. Remoteness and difficult access limit the number of viewers that would visit this location. This KOP has an abundance of vegetation that creates more color and interest to a viewer. There are still, however, few forms and lines to break up the valley floor.

KOP 5 – State Route 87

This viewpoint is located in the far southern end of the visual resources evaluation area looking to the north. SR 87 supports traffic with speeds exceeding 55 mph. There are few distinct turnoffs or other elements of interest that would stop or detain people along this section of road. The San Francisco Peaks are more than 50 miles away and yet are a dominant element in the landscape. The triangular shapes of the peaks, as well as the rising edge of Anderson Mesa, offer the greatest break in the flat skyline. The rolling hills in the foreground and middleground are covered in evenly distributed junipers and help to create some interest in the viewshed by leading the viewer to look toward the background views.

The following KOPs are located on Forest Service-managed lands managed for visual resources.

KOP 6 – Forest Service Road 125

This viewpoint is located on FS 125, along the eastern edge of Anderson Mesa, looking to the east. The KOP is located on National Forest System land that has a VQO of Modification. This view is elevated above the otherwise broad valley to the east. FS 125 starts to descend down the rim of the mesa near this viewpoint, and views are generally screened by vegetation. The vegetation transitions from pines to dense junipers as the road descends downward toward the valley floor. The evenly distributed junipers start to diffuse as the hills and mesa flatten out into the broad open plain.

KOP 7 – Forest Service Road 125/Forest Service Road 82

This view looks to the east along FS 125 from a point near the intersection of FS 82/FS 9483g. This KOP is located on National Forest System land that has a VQO of Foreground Partial Retention. This natural appearing view is random with open spots that transition between low to moderately tall vegetation areas with some isolated trees in between. The conical pines and mounding junipers create a stark contrast to the flat meadows in the area. The vibrant greens and yellows create a pleasing view. There are no designated camp grounds or viewing areas that would create prolonged views of the area.

KOP 8 – Forest Service Road 82

This viewpoint is located along FS 82, south of the intersection with FS 125, looking to the north. This KOP is located on National Forest System land that has a VQO of Foreground Partial Retention. This viewpoint has many aesthetically pleasing landscape features. The shapes in the pines and junipers, as well as some rocks, create interest as do the varying colors and values that are created by the random and varying sized vegetation.

KOP 9 – Forest Service Road 125/Western Electrical Transmission Line Corridor

This viewpoint is located on FS 125, looking to the north, along an existing electrical utility corridor. The KOP is located on National Forest System land that has a VQO of Foreground Partial Retention. Partial Retention implies that the landscape character appears slightly altered. Deviations from the natural setting are to be subordinate to the natural landscape character. This KOP generally looks north along Western's existing Glen Canyon-Pinnacle Peak Transmission Line corridor. The existing utility corridor creates a funneling effect on the viewer. The vegetation removed along the transmission line corridor creates an abrupt change in the flow of the landscape. The vegetation that is not removed and manipulated is moderate to tall (15–40 feet). The abruptness of the utility corridor is the main evidence of the human disturbances in the area. The unnatural change in form is in direct contrast to the random and isolated vegetation patterns that occur along FS 125. The distinct lines from the transmission lines and conductors are in direct contrast with the soft irregular lines that exist in the naturally evolving plants in the area.

3.12.2 Environmental Consequences

3.12.2.1 Standards of Significance

Impacts to visual resources would be considered significant if any of the following conditions were to occur:

- Reduce the VQO on Forest Service-managed lands more than one classification down. The Forest Plan allows a movement downward of one level in the VQO if the Forest Service decision-maker determines it an appropriate action.
- Conflict with the goals and policies of the Coconino County Comprehensive Plan on private and/or State trust lands.

Visual resources were analyzed for consistency with management objectives and the potential to affect visual receptors within the visual resources evaluation area. Visual receptors within the visual resources evaluation area consist of travelers along the major road corridors, visitors to Meteor Crater and Meteor Crater Enterprise, Inc. facilities, local recreation users, and ranchers.

This evaluation looks at impacts associated with construction, operations, and maintenance of the proposed wind park, transmission tie-line, and switchyard.

Visibility Analysis

A viewshed analysis was performed using GIS technology and a 90-meter digital elevation model to determine the extent to which proposed project components would be visible from the KOPs.

Figure 3.12-7 illustrates the results of the viewshed analysis. The analysis looked only at those lands within the visual resources evaluation area. Areas depicted in light blue illustrate areas where at least a portion of the proposed project components would be visible, meaning at least one WTG or one transmission structure would be visible. The analysis does not take into account existing vegetation conditions, nor distance, which would potentially limit views.

Distance Zones

Distance plays a key role in visual analysis. As part of the VMS, the Forest Service created distance zones, which are the same under the SMS. Figure 3.12-8 depicts viewing distances from the observer's point of view. Distance zones help in the inventory and analysis process. They are divided into three main categories: foreground, middleground, and background. These three divisions are used to describe the part of a characteristic landscape that is being inventoried or evaluated. A view in which all three distances zones are visible often has the greatest scenic quality. Distance zones are defined as:

- Immediate Foreground: views extend from the viewer up to a distance of 300 feet.
- Foreground: views (within 0.5 mile) are considered to be most sensitive due to the proximity to the viewer, and the ability to perceive detail.
- Middleground: views extend from 0.5 mile to 4.0 miles from the viewer where one can perceive individual landscape features under clear conditions, but not in great detail.
- Background: views extend beyond 4.0 miles and generally consist of viewing conditions where only broad landforms are discernable and where atmospheric conditions may render the landscape an overall bluish color. In general, the farther away from the project the viewer is, the smaller the impact.

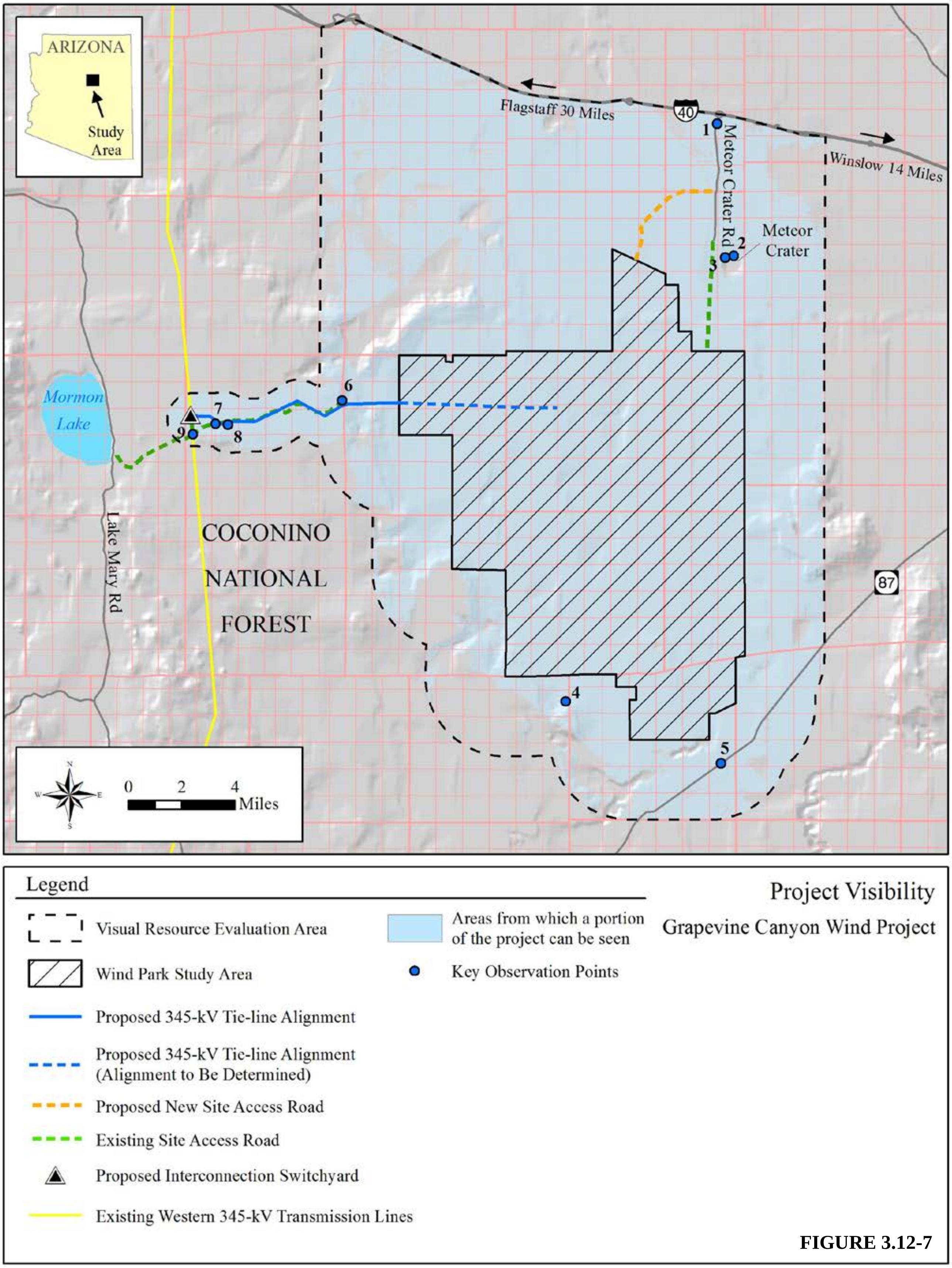
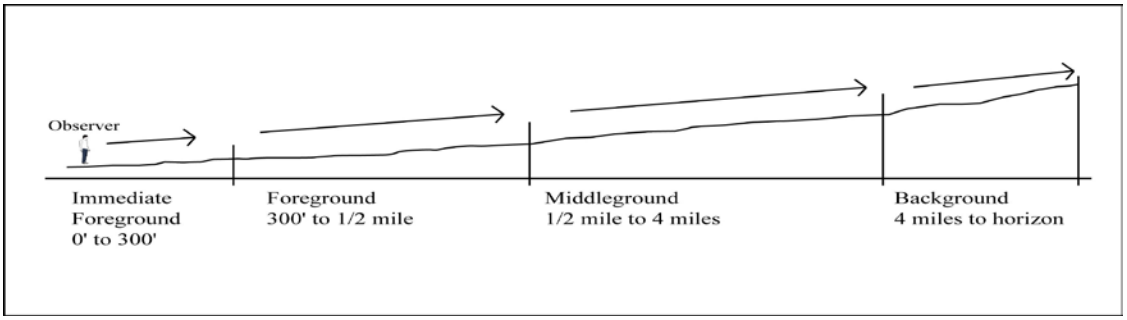

ARIZONA
Study Area
Flagstaff 30 Miles
40
Winslow 14 Miles
Meteor Crater Rd
Meteor Crater
1
2
3
4
5
6
7
8
9
Mormon Lake
Lake Mary Rd
COCONINO NATIONAL FOREST
87
0 2 4 Miles
Legend
Visual Resource Evaluation Area
Wind Park Study Area
Proposed 345-kV Tie-line Alignment
Proposed 345-kV Tie-line Alignment (Alignment to Be Determined)
Proposed New Site Access Road
Existing Site Access Road
Proposed Interconnection Switchyard
Existing Western 345-kV Transmission Lines
Areas from which a portion of the project can be seen
Key Observation Points
Project Visibility
Grapevine Canyon Wind Project

FIGURE 3.12-7

FIGURE 3.12-8
DISTANCE ZONES ILLUSTRATION



Source: Forest Service 1995b

3.12.2.2 Foresight's Proposed Project and Proposed Federal Actions

The Forest Service manages for visual resources and has established VQOs for all lands within the visual resources evaluation area under its jurisdiction. In addition, Coconino County has established policies pertaining to private and State trust lands to protect specific views from the effects of utility infrastructure projects. Regardless of land ownership or jurisdiction, the visual resource evaluation involved using the SMS to compare the expected visual change in the existing setting as observed at each of the KOPs. Specifically, the evaluation examined the contrast the proposed wind park, proposed transmission tie-line, and Western's switchyard would have on the existing landscape design elements of form, line, color, and texture. Current and potential VQO status is evaluated for KOPs on Forest Service-managed lands.

As part of the evaluation, photographic simulations were created to depict the expected view from each KOP. Vegetation is portrayed in most of the simulations. However, simulations prepared from KOPs located on Forest Service-managed lands were developed with and without vegetation. This was because vegetation is considered ephemeral, meaning that it may or may not be there in coming years. Photographic simulations from each KOP are included in Attachment A.

<u>Wind Park (as viewed from private and State trust lands)</u>

KOP 1 – Interstate-40

Views of the proposed wind park from this viewpoint would be brief and fleeting, limited by distance and topography. The proposed wind park would be the only proposed project component visible from this location. The proposed wind park would be located within background views and visible elements would include multiple straight, vertical lines. These vertical landscape elements would contrast with the gentle rolling hills that are visible in foreground views. In addition, movement created by the rotation of the blades attached to each turbine would further draw the viewer's attention. Distance to the proposed wind park would be more than five miles from this location and minimizes the visual contrast resulting in a minimal impact. Views towards the San Francisco Peaks and Anderson Mesa would not be obstructed by the proposed wind park from this location. Two simulations of the proposed wind park have been prepared from this viewpoint, one depicting a 500 MW wind park and one depicting an initial phase of up to 250 MW.

KOP 2 – Meteor Crater, Patio Window

Views of the San Francisco Peaks through the framed portion of the Meteor Crater Visitor's Center Patio Window would not be obstructed by the proposed wind park. However, a portion of the proposed wind park, located within middleground views, would be visible. The majority of the proposed wind park would be screened from view by a structure forming the Visitor Center's elevator shaft and by variations in topography forming the rim of Meteor Crater. The proposed wind park would introduce multiple vertical lines that would create a subtle contrast to the generally flat valley. The contrast would be slight in color, form and line; however, movement created by the rotation of the blades attached to each turbine would attract the viewers' focus to the presence of the WTGs. The changes that would occur from the wind park would not result in a deterioration of values on which the landmark designation is based because views of Meteor Crater itself would not change. A simulation of the proposed wind park has been prepared from this viewpoint depicting a 500 MW wind park.

KOP 3 – Meteor Crater Rim

Viewers would have a broad view of the north end of the proposed wind park from this viewpoint. A rock outcrop forming a portion of the rim of Meteor Crater would screen the southern three-quarters of the proposed wind park from view. Views of the proposed wind park would be in middle and background views. Other components of the proposed wind park would not be visible. The proposed wind park would introduce a series of tall vertical lines created by the WTGs that would stand in contrast to the generally flat valley, substantially changing the view. Movement created by the rotation of the blades attached to each turbine, as well as features of the guided tour along the crater rim, would further draw the viewers' focus to the foreign elements. The proposed wind park would create a moderate visual contrast from this viewpoint. While the wind park would change the views at middle and background distances, the WTGs are not within the Meteor Crater boundaries and do not change the geologic features of the site. In addition, the WTGs locations and distance from the Meteor Crater are such that they would not be noticeable in the foreground views. Views of the WTGs would not significantly impact the visitor's experience because the visitor's focus is on the crater itself and its history and geology. While visitors may enjoy the middle and background views from the site, those are not the primary features of the site. Two simulations of the proposed wind park have been prepared from this viewpoint, one depicting a 500 MW wind park and one depicting an initial phase of up to 250 MW.

KOP 4 – Chavez Pass

Views of the proposed wind park along this section of road are expansive to the north and east. Views of the proposed wind park would be in middle and background views, and other components of the proposed project would not be visible. The proposed wind park would introduce a high number of vertical lines that would stand in contrast to the rolling topography of the valley, partially blocking distant background views. This would result in a moderate to high visual contrast from this viewpoint. A simulation of the proposed wind park has been prepared from this viewpoint depicting a 500 MW wind park.

KOP 5 – State Route 87

Views of the proposed wind park would be apparent to motorists along this portion of SR 87. Views of the WTGs would be in the middle and background views. Other components of the proposed project would not be visible. The proposed wind park would introduce a number of vertical structures, standing in contrast to the natural setting in scale, form, line, and color. Movement created by the rotation of the turbine blades would further enhance this contrast and draw the viewer's attention. The more distant the WTGs, the less evident the contrast, as vegetation and topography further screen these structures. Views of the San Francisco Peaks would be partially blocked by some of the closest WTGs. The proposed wind park would create a high visual contrast from this viewpoint; however, the nearest WTG would be located more than one mile from the highway in accordance with current County goals and policies. Two simulations of the proposed wind park have been prepared from this viewpoint, one depicting a 500 MW wind park and one an initial phase of up to 250 MW.

Based on the visual evaluation for the proposed wind park, the proposed wind park would not conflict with current County goals and policies and all WTGs would be located greater than one mile from major travel corridors. Therefore, the proposed wind park would not cause significant impacts to visual resources.

<u>Wind Park (as viewed from Coconino National Forest)</u>

KOP 6 – Forest Service Road 125

This view is different from the other KOPs because it is elevated above the valley and both the proposed wind park and proposed transmission tie-line would be clearly visible within the viewshed. The proposed transmission tie-line is visible within foreground views, and the proposed wind park and transmission tie-line are visible in middleground and background views from this viewing location. The proposed wind park and transmission tie-line would introduce elements of form, line, scale, and color that would contrast with the otherwise natural valley floor. In addition, movement created by the rotating blades of the wind turbines would further attract attention. Although views along this travel corridor would be sporadic due to topographical variations and screening from vegetation, the proposed wind park and transmission tie-line would result in a moderate contrast. However, since the current VQO is Modification, the addition of the proposed wind park and transmission tie-line would not change the VQO. A simulation of the proposed wind park and transmission tie-line has been prepared from this viewpoint depicting a 500 MW wind park.

<u>Transmission Tie-line</u>

KOP 7 – Forest Service Road 125/Forest Service Road 82

Views of the proposed transmission tie-line would be evident to travelers as the line crosses from the south side of FS 125 to the north side. The proposed transmission tie-line would be located within foreground and middleground views. The proposed wind park and Western's proposed switchyard would not be visible from this viewpoint. The elements of the proposed transmission tie-line would create contrast in form, line, scale, and color. The visual contrast created would be moderate from this location. Two simulations of the proposed transmission tie-line have been prepared from this viewpoint, one with vegetation and one without vegetation. The proposed transmission tie-line would not meet the current VQO of Partial Retention at this site and would result in a movement down one level to a VQO of Modification.

KOP 8 – Forest Service Road 82

The proposed transmission tie-line would be visible in immediate foreground, foreground, and middleground views. The proposed wind park and Western's proposed switchyard would not be visible from this viewpoint. Transmission tie-line structures would be evident in great detail because of their proximity to the viewer. The structures would introduce elements of scale, form, line, color, and texture that would create a moderate contrast to the existing landscape. In addition, the transmission tie-line would partially interfere with views towards the San Francisco Peaks. Two simulations of the proposed transmission tie-line have been prepared from this viewpoint, one with vegetation and one without vegetation. The proposed transmission tie-line would not meet the VQO of Partial Retention at this site and would result in a movement down one level to a VQO of Modification.

Impacts associated with the construction and operation of the step-up substations would have no significant impact on the visual resources of the area. There are no state trust or private land management objectives pertaining to the aesthetics of the area. The remote location of the step-up substations reduces the number of persons who might view this infrastructure. The approximately seven-mile-long extension tie-line required by these facilities has the same attributes, limited number of viewers and no management goals or policies for its area, constraining its impact on visual resources.

Western’s Switchyard

KOP 9 – Forest Service Road 125/Western Electrical Transmission Line Corridor

Views of Western’s proposed switchyard and the proposed transmission tie-line would be visible in middleground views from this viewing location. The proposed wind park would not be visible. In addition to the existing electrical transmission line structures, the proposed switchyard and transmission tie-line would introduce new structures into the viewshed adding further contrast in form, line, and color. The visual contrast created by the proposed switchyard and transmission tie-line would be low from this viewing location, because new facilities would be similar to existing man-made modifications. The proposed switchyard and transmission tie-line are located outside of the viewshed managed for Partial Retention and would not affect this VQO. Two simulations of the proposed switchyard and transmission tie-line have been prepared from this viewpoint, one with vegetation and one without vegetation.

Temporary Impacts

Short term impacts would result from construction activities. A visual impact not isolated to the visual resources evaluation area could be attributed to construction equipment in transit. Large numbers of construction vehicles carrying turbines and other construction materials would be evident to commuters and other regular highway drivers. Though periodic rather than constant, construction traffic would be seen primarily by others in transit. These impacts are considered temporary and minimal.

Disturbances in vegetation would be evident for the WTG foundations, batch plant operation area, staging areas, and road development. Changes to the soil color and a reduction of the understory vegetation would be evident especially to viewers that would have an elevated view of the proposed project components. In the long-term, some of those disturbances would be softened as the understory vegetation grows back or is otherwise restored.

Construction related impacts are anticipated to be moderate but temporary, and would occur over a 12- to 18-month timeframe for each 250 MW phase. During construction of the proposed 500 MW wind park, transmission tie-line, and Western’s switchyard, approximately 2,419 to 2,630 acres of land would be altered which would temporarily interfere with the existing visual quality of the site. To minimize visual impacts, both during and after construction, RPMs as outlined in Section 2.7 would be implemented.

Light and Glare

Under FAA guidelines, lighting is required on the WTGs for aircraft safety. The required lighting would be a new visual element introduced to the area’s landscape. The lights would be most noticeable during night-time hours. Additionally, security lighting would be required at Western’s switchyard and the proposed step-up substations and O&M facility. All project-related lighting would be limited to what is specifically required as outlined in the RPMs (Section 2.7 under Visual Resources), including keeping exterior lighting on the turbines required by the FAA to the minimum number and intensity required to meet FAA standards. With this measure, the proposed wind park would be consistent with the current County goals, and policies and significance standards listed in Section 3.12.2.1 would not be exceeded.

Impacts associated with glare from the proposed WTGs would be minimal. Variables to consider include the amount of sunshine and the time of day. The turbines and transmission tie-line towers would create minimal glare under the correct conditions; however, this would be minimized to the extent possible by the use of non-reflective paint as outlined in the RPMs (Section 2.7).

3.12.2.3 Alternative Transmission Tie-line Corridor

The alternative transmission tie-line would create less of a visual impact than the proposed transmission tie-line because it would not be located within VQO Partial Retention areas on National Forest System lands, and would be located farther away from the intersection of FS 125 and FS 82. Therefore, the alternative transmission tie-line would not alter the VQOs prescribed by the Forest Plan. KOPs 7 and 8 are located in the vicinity of the alternative transmission tie-line. Two simulations from each of these KOPs have been prepared depicting the alternative transmission tie-line, one with vegetation and one without vegetation. The photographic simulations are included in Attachment A.

3.12.2.4 No Action Alternative

No direct or indirect impacts on existing visual resources would result through implementation of the No Action Alternative. Under this alternative, Western would not approve an interconnection for the Grapevine Canyon Wind Project, and the Forest Service would not issue a permit for the transmission tie-line proposed for the wind park. The proposed wind park, transmission tie-line, and switchyard would not be constructed and visual resources would remain unchanged.

3.13 UNAVOIDABLE ADVERSE IMPACTS

Pursuant to NEPA regulations (40 CFR 1502.1) an EIS must consider adverse environmental effects that cannot be avoided. Unavoidable impacts are those that would occur after implementation of all Foresight and agency RPMs and other recommended mitigation measures. Unavoidable impacts do not include temporary or permanent impacts that would be mitigated. They also do not include impacts from speculative events such as hazardous waste spills that are not cleaned up promptly in accordance with accepted mitigating measures.

The preliminary layout plan was prepared to avoid or reduce impacts on resources. However, construction, operation, and maintenance of the proposed project would result in unavoidable adverse impacts to biological resources, cultural resources, and visual resources within the project study area, as described below. A Biological Assessment (BA) is being prepared under Section 7 of the ESA for Federally-listed species. The BA would be used to support a determination on whether or not the proposed Federal actions would adversely affect Federally-listed species. If Western determines that the proposed Federal actions could adversely affect listed species, Western and USFWS would enter into formal consultation. Under formal consultation, the USFWS would issue a Biological Opinion with conditions and reasonable prudent alternatives to minimize adverse effects. If required, the findings of the Biological Opinion would be summarized in the Records of Decision issued by Western and the Forest Service. Conditions identified in the Biological Opinion would be followed by Western, the Forest Service, and Foresight.

3.13.1 Wind Park

Construction and operation of the proposed wind park would lead to the loss of some biological resources. Native vegetation and wildlife habitat would be removed in order to accommodate the proposed facilities. Any avian and bat mortalities caused by the operation of the wind park would be an unavoidable adverse impact. Any avian and bat mortalities would be addressed by Foresight pursuant to its Avian and Bat Protection Plan.

Any unavoidable adverse impacts to cultural resources cannot be determined until the results of the Class III Survey and Traditional Cultural Properties Survey are completed. A PA has been developed among Western, Forest Service, SHPO, affected Federal and State agencies, Foresight, and all interested Native American Tribes in conjunction with preparation of the EIS to ensure that Section 106 requirements are met. The preferred mitigation measure is to avoid identified sites; however, the PA would define a process for addressing any cultural resource sites eligible for or on the NRHP that cannot be avoided during the construction of the wind park.

The construction and operation of the wind park, especially the introduction of the WTGs, would permanently change the visual landscape of the area by introducing broad visual contrast to the natural landscape. The visual change would vary by individual and perspective, but would generally be apparent in all directions, extending for several miles beyond the wind park.

3.13.2 Transmission Tie-line and Switchyard

Unavoidable adverse impacts to biological resources, cultural resources, and visual resources as a result of construction and operation of the proposed transmission tie-line and switchyard would be similar to those described under the wind park. The PA would address a process for addressing any cultural resource sites eligible for or on the NRHP that cannot be avoided during the construction of the proposed transmission tie-line and switchyard.

3.14 SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

Pursuant to NEPA regulations (40 CFR 1502.16), an EIS must consider the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. The impacts and use of resources associated with the proposed project are described in resource sections in this chapter.

The proposed project includes up to 333 WTGs, capable of generating a combined capacity of up to 500 MW of renewable electric power. Electricity generated in this manner results in minimal emissions of pollutants or greenhouse gases to the atmosphere. The anticipated electrical output of the proposed wind park would be collected at the step-up substations, transmitted along the proposed 345-kV transmission tie-line, and connected to the regional grid at the proposed switchyard.

The relationship between the short-term uses of the environment and the maintenance and enhancement of long-term productivity with regard to the proposed project considers the use of the wind to generate electricity and the use of the land and airspace to locate the wind generating facility. The use of the land and airspace to construct and operate a wind generating facility considers its “footprint.” Development of the proposed project would require commitments of resources such as soil, water, vegetation, wildlife populations and habitats, noise, visual resources, and land use for the life of the proposed project. Impacts to transportation resources and social and economic resources would occur primarily during construction. Revenue would likely increase for some local businesses, such as construction suppliers, hotels, restaurants, gas stations, and grocery stores in response to the needs of workers associated with constructing the proposed project.

Construction and operation of the proposed wind park would convert approximately 591 acres of ranchland to utility-related uses for the life of the project, which is estimated for a period of 20 years unless landowner lease agreements are renewed. However, the proposed wind park would result in few changes to existing agricultural practices because grazing would continue in and around the WTGs and other proposed project facilities. As a result, there would be minimal effects on the overall grazing capacity of the area.

Construction and operation of the proposed transmission tie-line and switchyard would convert between 8 and 11 acres of private and State trust land and between 26 and 29 acres of Forest Service-managed lands to utility-related uses within the proposed right-of-way. The alternative transmission tie-line would also convert between 8 and 11 acres of private and State trust lands, but would convert between 27 and 30 acres of Forest Service-managed lands to utility-related uses within the proposed rights-of-way. Existing uses of these lands, including ranching activities and dispersed recreation, would be allowed to continue around the transmission tie-line structures and the switchyard; thus, the short-term use for the proposed project would not affect the long-term productivity of the area's grazing and recreational resources.

Compared to other energy types consumed by users in Arizona and other southwestern U.S. states, wind energy makes up a very small fraction the region's total energy consumption. Energy generated by the wind could displace energy generated from other nonrenewable sources (i.e., fossil fuels) that have associated environmental and public health issues, namely air emissions, greenhouse gas generation, fossil fuel extraction, transportation, and spent fuel storage and disposal.

The wind is used as the energy source to move the turbines that generate electricity. Unlike non-renewable sources, wind turbines do not deplete their energy source; energy generation is continuous and dependent on the flow of wind. Based on this fundamental dynamic of wind energy, the long-term productivity, in this case the generation of electricity, would be maintained because of the renewable nature of wind power. While the short-term use of the land to construct and operate the wind facility would displace other uses of the area (i.e., grazing, wildlife habitat, dispersed recreational uses), there would be benefits to long-term productivity associated with the use of less than 800 acres of private, State trust, and Forest Service-managed lands to generate and transport wind energy. Long-term reductions in the region's reliance on nonrenewable energy sources and air emissions balance the short-term loss of use of this land for ranching, wildlife habitat, dispersed recreation, and other possible uses of the project study area.

If the proposed project is decommissioned, the facilities could be removed and the area of disturbance could be reclaimed. If this were to occur, it would restore the long-term productivity of the land for ranching, wildlife habitat, and dispersed recreation.

3.15 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA regulations (40 CFR 1502.16) dictate that an EIS must consider irreversible or irretrievable commitments of resources. An irreversible commitment of a resource is one that, once committed to the proposed project, would continue to be committed throughout the life of the project and would result in a loss of future options. An irretrievable commitment of resources refers to those resources that, once used, consumed, destroyed, or degraded during construction, operation, or decommissioning of the proposed project, would cause the resource to be unavailable for use by future generations. Irretrievable commitment of resources applies to loss of nonrenewable resources such as minerals or cultural resources.

The construction and operation of the proposed wind park, transmission tie-line, and switchyard on Federal, State, and private lands would change the use of directly- and indirectly-affected parcels for the life of the project. Use of natural resources that ordinarily occur in the area would be limited by the dedicated use of the area for wind energy development. Consequently, some loss of production of certain resources such as forage for livestock and wildlife would occur during the time that those lands are out of production. However, because the turbines and other components of the facility could be removed, and the land restored to pre-construction conditions, the commitment of the land would not result in long-term irreversible or irretrievable commitment of resources.

The loss of soil productivity associated with the WTG pads, transmission tie-line structures, and access roads would result in an irreversible commitment of resources. This loss of productivity could be minimized after restoration and revegetation, but this could take a substantial amount of time because of the arid nature of the project study area.

Operation of the wind farm would likely result in some avian and bat mortalities, which would constitute an irretrievable loss of these individuals.

Cultural resources such as prehistoric sites, historic properties, and cultural landscapes are non-renewable resources. Inadvertent or accidental destruction of cultural resources during construction that might occur despite mitigation actions would be an irretrievable commitment of resources. The preferred mitigation measure is to avoid identified sites; however, the PA would define a process for addressing any cultural resource sites eligible for or on the NRHP that cannot be avoided during the construction of the wind park, transmission tie-line, and switchyard, or discovered during foundation excavations.

Beyond the natural and cultural resource commitments, there have been financial resources already expended by the project proponent, Western, and the Forest Service for the planning and review of the proposed project. The expenditure of funds would continue throughout the permitting and construction phases of the project should the project be approved (e.g., for permitting, site plan approval, building and construction inspections; for research and monitoring programs; and for the large investment in WTGs, transmission tie-line components, the switchyard, and other associated infrastructure). Such financial resources would not be available for other uses.

An undeterminable amount of energy would be spent on fabrication of the components for the proposed project which would be offset by energy produced by the proposed project. An example would be the energy required to manufacture the WTG towers and blades and the transmission tie-line structures. The proposed project would also result in unknown offsets from other energy development, providing electrical power that would otherwise have to be generated by another generation facility (possibly using non-renewable resources) at another location.

While many of the components of the proposed project could be recycled following decommissioning, particularly the metal components, there would be an irretrievable commitment of some non-recyclable building materials (gravel and cement) and fuel for construction equipment.

The life of the proposed wind park is expected to be 20 years or more, and the wind park owner could elect to renew the land leases at the end of the contracted agreements. The decision to renew the leases versus decommissioning of the facility would be made at that time and would be based on power market conditions and future contracts for sale of electricity from the wind generating facility. Depending on current wind turbine technology, at the end of the lease period, the WTGs could be updated with more efficient components, thereby extending the service life of the proposed wind park. If the WTGs are not upgraded and upon termination of operations, the wind park owner would have the obligation to decommission the facility and perform reclamation as required by the landowners and appropriate land management agencies or jurisdictional authorities.

CHAPTER 4: CUMULATIVE EFFECTS

4.1 INTRODUCTION

"Cumulative impact" is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7). Interactive effects could be either countervailing, where the net cumulative effect is less than the sum of the individual effects, or synergistic, where the net cumulative effect is greater than the sum of the individual effects. The Council on Environmental Quality (CEQ) handbook for considering cumulative effects advises the cumulative effects analysis should "count what counts," meaning the analysis should not consider a long list of issues with little relevance to the effects of the proposed action (CEQ 1997). This analysis focuses on the cumulative effects of the proposed action (wind park, transmission tie-line, and switchyard), alternative action (transmission tie-line alternative), and no action alternative when considered together with other past, present, and reasonably foreseeable future actions that affect the same resources. The goal of the analysis is to provide the decision makers with a "big picture" view of the effects, not only of the proposed action and alternatives, but all other actions occurring within the same geographic region on the future sustainability of important resources.

4.2 CUMULATIVE EFFECTS ANALYSIS AND METHODOLOGY

Thus far, the EIS has focused on the direct and indirect impacts from the project as a whole, including the effects of the proposed wind park, transmission tie-line, and switchyard; transmission tie-line alternative; and no action alternative. RPMs, outlined in Section 2.7, have been incorporated into the design of the proposed project components to minimize the direct and indirect effects of the project and thereby minimize any potential cumulative impacts.

In order to identify and understand the cumulative effects that would result from implementing any of the alternatives under consideration in this EIS, a three-step process was followed.

1. Identify other past, present, and reasonably foreseeable future actions that have had, or would have, broad influences on shaping the environmental conditions of the area.
2. Identify the cumulative effects of past, present, and reasonably foreseeable future actions on each resource and the additional incremental effect that would result from implementing each alternative.
3. Determine if the incremental (additional) affect of the proposed project creates a significant cumulative effect.

4.2.1 Identify Past, Present, and Reasonably Foreseeable Future Actions

Spatial and temporal boundaries are important in defining the limits of the cumulative effects analysis. These limits are variable, dependent on the reach of each affected resource and for purposes of identifying other actions to consider as part of this analysis, are defined by the impact zone of each resource.

Geographic limits of the analysis have been defined for each resource in Chapter 3, with the exception of biological resources, and are defined as resource evaluation areas. Resource evaluation areas include an area as large as Coconino and Navajo counties, to as small of an area no larger than the footprint of the proposed wind park, transmission tie-line, and Western's proposed switchyard.

The geographic limit of the cumulative impacts analysis for biological resources was expanded beyond the evaluation area described in Chapter 3.

The timeframe for considering past activities extends back 50 years. Actions occurring in the more distant past, such as prehistoric and historic settlement, are incorporated into the environmental baseline. The reasonably foreseeable future actions considered are those that can be identified from recent decisions, plans, proposed projects, or from reasonable extensions of current or emerging trends.

Following the identification of past, present, and reasonably foreseeable future actions, these actions were looked at in the context of each resource to determine if the resources have been or would be affected. If an action has not, or would not, occur within the geographic or temporal impact zone of a particular resource it was not considered in the cumulative effects analysis of that resource.

Past, present, and reasonably foreseeable future actions that have had, or would have, broad influences on shaping the environmental conditions of the area are identified and described in Table 4.2-1.

TABLE 4.2-1
SUMMARY OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Action	**Description**	**Affected Resources**
Bar T Bar/Anderson Springs Allotment Management Plan (Future)	The plan describes livestock management practices on the Bar T Bar and Anderson Springs Allotments. The plan proposes numerous activities that address livestock management, livestock grazing, waterfowl nesting on wetlands, habitat conditions for pronghorn on Summer and Winter range, and canopy densities in pinyon-juniper and ponderosa pine vegetation types in areas that have been historical grasslands. Specifically, the plan provides measures to protect wetlands and develop new water sources to replace previously used wetlands; construct new upland stock tanks; maintain and construct new barbwire fences in certain areas and remove barbwire fence to facilitate pronghorn movement in other areas; install cattle guards; and harvest and remove pinyon pine, juniper and ponderosa pine trees in areas that have been historical grasslands.	• Land Use • Biological Resources • Geology and Soils • Water Resources
Community settlement/ development	The communities of Flagstaff and Winslow were established in the late 1800s and continue today. Dispersed settlement and smaller communities have also been established throughout northern Arizona. These communities operate as centers for economic development, learning, and social interaction.	• Air Quality • Water Resources • Socioeconomics • Environmental Justice
Construction and on-going use of utility infrastructure	Utility infrastructure is located throughout developed and undeveloped areas of the region. One example is the twin 345-kV electrical transmission tie-lines operated by Western that are located approximately seven miles west of the wind park study area. Utility infrastructure can be above or underground and typically includes a right-of-way and an access route for routine inspection and maintenance.	• Land Use • Biological Resources • Visual Resources
Ongoing prescribed burning on the Mogollon Rim and Mormon Lake Ranger districts	Fuels reduction projects are ongoing and are located throughout the Mogollon Rim and Mormon Lake Ranger districts of the Forest. The purpose of these projects is to reduce fire risk and improve forest health. This is accomplished by a variety of treatments including prescribed fire management activities.	• Biological Resources • Air Quality

TABLE 4.2-1 SUMMARY OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS		
Action	**Description**	**Affected Resources**
Operation of the Bar T Bar Ranch	The land that comprises Bar T Bar Ranch has been acquired from several ranches. Bar T Bar extends across approximately 326,200 acres. The ranch is located on private land, ASLD grazing leases, and grazing allotments from the Forest Service.	• Land Use • Biological Resources • Geology and Soils • Water Resources • Socioeconomics
Operation of the Flying M Ranch	Flying M Ranch is a combination of a number of historic homesteads. The ranch covers approximately 90,000 acres, a quarter of which is located on private land, and the remainder of which consists of grazing allotments from the Forest Service and leased from ASLD.	• Land Use • Biological Resources • Geology and Soils • Water Resources • Socioeconomics
Operation of Meteor Crater development	Meteor Crater Enterprises, Inc. operates visitor services and a museum, gift shop, and fast food restaurant near the north rim of Meteor Crater. In addition, Meteor Crater Enterprises, Inc. operates another development located at the Meteor Crater Road exit, south of I-40. The development includes an RV park, convenience market with gas sales, and a fast food restaurant. Business offices for Meteor Crater Enterprises, Inc. are also located in this development.	• Land Use • Socioeconomics
Recreation and hunting	Recreation opportunities including camping, all-terrain vehicle use, picnicking, hiking, rock climbing, horseback riding, mountain biking, and permitted hunting of big and small game.	• Land Use • Biological Resources • Geology and Soils • Socioeconomics
Sunshine Wind Project (Future)	The proposed Sunshine Wind Park is located just north of the wind park study area. This project received a Conditional Use Permit from Coconino County in 2005 and would advance pending a power purchase agreement. The Sunshine Wind Park is designed to include approximately 40 state-of-the-art wind turbines to provide approximately 60 MW of generating capacity, enough electricity to serve the average annual electricity needs of more than 14,000 homes.	• Land Use • Biological Resources • Cultural Resources • Water Resources • Socioeconomics • Visual Resources
Travel Management Rule (Future)	Identification of a system of roads and trails across the Forest to remain open to motorized use. The Travel Management Rule (TMR) also designates camping corridors where off-road travel is permitted a short distance from roads to facilitate camping.	• Land Use • Biological Resources • Geology and Soils • Transportation
Use of I-40 and State highway system	The National Interstate Highway System was formed in 1957, but I-40 was not officially completed in Arizona until 1984. The interstate along with State highways are used heavily for commercial transportation of goods and personal travel.	• Air Quality • Socioeconomics • Transportation

4.2.2 Identify the Cumulative Effects of Other Past, Present, and Reasonably Foreseeable Future Actions

The cumulative effects of other past, present, and reasonably foreseeable future actions on individual resources are provided in Table 4.2-2. In addition, a summary of the incremental effects of the proposed project, alternatives, and no action alternative are included for reference.

TABLE 4.2-2 SUMMARY OF CUMULATIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS AND THE INCREMENTAL EFFECTS OF THE PROPOSED PROJECT				
Resource	**Past, Present, and Reasonably Foreseeable Future Actions**	**Proposed Project**	**Alternative Tie-Line**	**No Action Alternative**
Land Use	Present actions have introduced two primary ongoing land uses to the area, including livestock grazing and recreation opportunities. The development of Meteor Crater and utility infrastructure have increased recreational opportunities by providing access through either a developed facility or use of access roads. In addition, utility infrastructure has increased available forage within the rights-of-way by removing overstory vegetation. Future actions would reduce grazing and recreation by reducing the total number of acres available for grazing and range improvements and road closures that would reduce access to recreation sites.	Would result in a permanent conversion of 591–627 acres of land from grazing to other use, but would not incrementally increase cumulative impacts.	Would result in a permanent conversion of 592–628 acres of land from grazing to other use, slightly more than under the proposed transmission tie-line, but would not incrementally increase cumulative impacts.	Would result in no change to existing land uses.
Biological Resources	Grazing affects the habitat of several threatened and endangered species, including southwestern willow flycatcher, bald eagle, Mexican spotted owl, black-footed ferret, Chiricahua leopard frog, and Little Colorado spinedace. In addition, grazing affects the habitat of several species of migratory birds and several Forest Service MIS. Temporary construction impacts on wildlife species as a result of the Sunshine Wind Project would be expected to be similar to those of the proposed project; namely, displacement would be short-term and localized, and individuals could return to the area.	Would result in a permanent conversion of 591–627 acres of land from scrub-shrub, grassland, pinyon/juniper woodlands, and ponderosa pine. This conversion would result in lost habitat for common and special-status species, but would not incrementally increase cumulative impacts.	Would result in a permanent conversion of 592–628 acres of land from scrub-shrub, grassland, pinyon/juniper woodlands, and ponderosa pine. This conversion would result in lost habitat for common and special-status species, but would not be noticeably different than under the proposed project and would not incrementally increase cumulative impacts.	

TABLE 4.2-2
SUMMARY OF CUMULATIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS AND THE INCREMENTAL EFFECTS OF THE PROPOSED PROJECT

Resource	Past, Present, and Reasonably Foreseeable Future Actions	Proposed Project	Alternative Tie-Line	No Action Alternative
Biological Resources (continued)	In general, past and present activities affect plant composition, increase spread of noxious weeds, increase sedimentation in streams, and increase competition for forage. Grazing management plans and the proposed TMR would reduce many of the negative effects of grazing and actually improve habitat. The Sunshine Wind Project would result in ground disturbance and could affect specific special status plant and wildlife species, including birds, raptors, and bats.	Upon completion of construction of the proposed project facilities, the level of impact would not significantly impact populations even when considered in context of other ongoing or reasonably foreseeable future projects or activities. The long-term effects on wildlife species from the proposed project, in combination with the Sunshine Wind Project, could result in cumulative impacts on wildlife, particularly migratory birds, raptors, and bats. Past, present, and anticipated developments with aerial features, such as wind turbines and transmission tie-lines, could reasonably cause collisions to increase over current conditions. Consideration of the areal extent of these projects and the incorporation of mitigation measures to minimize impacts, however, would result in incremental cumulative impacts to birds, raptors, and bats.	Impacts to common and special status plant and wildlife species would not be noticeably different than under the proposed project. Likewise, cumulative impacts on migratory birds, raptors, and bats would be identical to the proposed project, and incremental cumulative impacts to birds, raptors, and bats would occur.	

TABLE 4.2-2
SUMMARY OF CUMULATIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS AND THE INCREMENTAL EFFECTS OF THE PROPOSED PROJECT

Resource	Past, Present, and Reasonably Foreseeable Future Actions	Proposed Project	Alternative Tie-Line	No Action Alternative
Cultural Resources	The Sunshine Wind Project would result in ground disturbing activities in the vicinity of Historic Route 66 and areas known to have been used prehistorically and historically. Ground disturbance could result in the destruction of an NRHP-eligible or listed site. In addition to the potential for direct impact to sites, increased access to the area could result in inadvertent disturbance or vandalism to otherwise undisturbed sites. Visual intrusions on TCPs in the region are also likely.	Would directly disturb between 2,419–2,630 acres of land within areas known to have been used prehistorically and historically. Archaeological, Tribal or historical sites listed, or eligible for listing, on the NRHP would be avoided to the extent possible and no significant direct impacts would occur. Visual intrusions on TCPs in the region are likely and would result in indirect adverse impacts. The proposed project would not incrementally increase cumulative effects.	Would directly disturb between 2,420–2,631 acres of land within areas known to have been used prehistorically and historically, slightly more than the proposed project. Impacts would not be noticeably different than under the proposed project. The alternative transmission tie-line would not incrementally increase cumulative effects.	Would have no effect on cultural resources.
Geology and Soils	Ranching and recreation have affected soil protective mechanisms, causing erosion and lost productivity. Grazing management plans and the proposed TMR would lead to increases in ground cover which would decrease erosion.	Would temporarily disturb between 2,419–2,630 acres of land and would permanently remove vegetation from and alter the surface of 591–627 acres of land. This would result in increased erosion and the permanent loss of soils, but not at a level that would result in significant incremental addition to cumulative impacts to soils.	Would temporarily disturb between 2,420–2,631 acres of land and would permanently remove vegetation from and alter the surface of 592–628 acres of land. Impacts would be slightly greater than under the proposed project because the transmission tie-line associated with the alternative action requires a new access road across moderately erosive soils that are difficult to revegetate, but still not a significant incremental increase.	Would have no effect on geology and soils.

TABLE 4.2-2 SUMMARY OF CUMULATIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS AND THE INCREMENTAL EFFECTS OF THE PROPOSED PROJECT				
Resource	**Past, Present, and Reasonably Foreseeable Future Actions**	**Proposed Project**	**Alternative Tie-Line**	**No Action Alternative**
Air Quality	Communities and transportation infrastructure deteriorate air quality through vehicle emission, heating, etc. However, air quality standards are currently being met. Prescribed fires on the Forest would contribute short-term smoke into the airshed; however, all prescribed burns are permitted by ADEQ and fall within established air quality limits. Wildfires could create smoke that exceeds air quality standards.	Due to the short duration, air impacts from the proposed project would not incrementally increase cumulative impacts.	Due to the short duration, air impacts from the proposed project would not incrementally increase cumulative impacts.	Would have no effect on air quality.
Water Resources	Water quality is affected by erosion and sedimentation as a result of grazing and other ground disturbing activities. Water is consumed in Coconino County by municipal, industrial, and agricultural activities at a rate of approximately 105,000 acre-feet of groundwater and 51,000 acre-feet of surface water annually. If constructed, the Sunshine Wind Park could increase erosion and sedimentation and would consume a relatively small amount of water during construction.	Construction would require approximately 307 acre-feet of groundwater. Operations would require a negligible amount of water. Soil erosion and sedimentation would increase as a result of the temporary disturbance of between 2,419–2,630 acres of land and the permanent disturbance and removal of vegetation from 591–627 acres of land. With the proposed RPMs, the proposed project would not incrementally increase cumulative water resource impacts.	Construction and operations would require the same amount of water as the proposed action. Between 2,420–2,631 acres of land would be disturbed temporarily and 592–628 acres of land would be permanently disturbed resulting in erosion and sedimentation. Impacts would not be noticeably different than under the proposed transmission tie-line. With the proposed RPMs, the proposed project would not incrementally increase cumulative water resource impacts.	Would have no effect on water resources.

TABLE 4.2-2
SUMMARY OF CUMULATIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS AND THE INCREMENTAL EFFECTS OF THE PROPOSED PROJECT

Resource	Past, Present, and Reasonably Foreseeable Future Actions	Proposed Project	Alternative Tie-Line	No Action Alternative
Socio-economics	Established communities, such as Flagstaff and Winslow, and existing transportation infrastructure have lead to economic activity and an increase in population and employment. Ranching, recreation and other developments such as Meteor Crater further contribute to employment opportunities and subsequent population growth. The Sunshine Wind Project would create some jobs and would provide other forms of revenue to the economy.	Would result in the employment of approximately 400 workers during peak construction activities and between 17–40 workers during regular operations if fully built out to 500 MW. In addition, it would create a supplemental source of revenue to ranchers. The proposed project would result in a positive incremental increase to cumulative socioeconomic impacts.	Would be the same as the proposed project.	Would not realize the economic objectives of the Diablo Canyon RPA since no similar economic development proposals are currently under consideration.
Environmental Justice	The region is the historic home to Native American populations whose current socioeconomic conditions result in higher percentages of persons living below the Federal poverty level. The cities of Winslow and Flagstaff also contain percentages of low-income, minority, and Native American populations.	Since the proposed project would result in additional employment opportunities and tax revenue, the proposed project would not incrementally increase cumulative effects to minority and low-income populations.	Would be the same as the proposed project.	Would have no effect on environmental justice, beneficial or otherwise.

TABLE 4.2-2
SUMMARY OF CUMULATIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS AND THE INCREMENTAL EFFECTS OF THE PROPOSED PROJECT

Resource	Past, Present, and Reasonably Foreseeable Future Actions	Proposed Project	Alternative Tie-Line	No Action Alternative
Transportation	Transportation routes, including I-40, SR 87 and a system of County and Forest Service roads have been established and are generally considered adequate. The proposed TMR would designate a road system on the Forest and would close the Forest to cross-country travel.	Would result in a short-term (12–18 month) increase in construction related traffic of over 400 two-way vehicle trips each day on I-40 and Meteor Crater Road and approximately 25 two-way vehicle trips each day on Lake Mary Road and FS 125. It would result in a minimal long-term increase in vehicular traffic on I-40 and Meteor Crater Road. Due to the short duration of construction, the proposed project would not incrementally increase cumulative impacts to transportation.	Would be the same as the proposed project.	Would have no effect on transportation.
Visual Resources	Utility infrastructure has introduced contrasting elements of form, line, and color. The Sunshine Wind Project would further introduce contrasting elements of form, line, and color over a large area and reduce the quality of background views. The development of the Sunshine Wind Project would actually minimize the direct visual impact of the proposed wind park by introducing similar elements in closer proximity to the greatest number of viewers near I-40.	Would result in a visual contrast by introducing contrasting elements of form, line, and color. In addition, the proposed transmission tie-line would be located within an area on Forest Service-managed lands managed with a VQO of Partial Retention. The proposed project would be considered a negative incremental impact to visual resources on Forest Service-managed lands.	Effects would generally be the same as the proposed action, except the transmission tie-line would be routed to avoid the more sensitive area (Partial Retention) on Forest Service-managed lands. Incremental impacts associated with the alternative transmission tie-line would not result in a significant cumulative impact to visual resources.	Would have no effect on visual resources.

4.2.3 Cumulative Effects of the Proposed and Alternative Actions when Added to Past, Present, and Reasonably Foreseeable Future Actions

This third and final step involves determining whether or not the incremental effects of each alternative, when added with the effects of past, present, and reasonably foreseeable future actions, would result in a significant cumulative effect. In other words, would the additional impacts to a resource, resulting from the implementation of the proposed action, alternative action, or no action alternative, when added to the impacts to that resource that have or would result from other past, present, or reasonably foreseeable future actions, push that resource over the edge. The same standards of significance identified for each resource in Chapter 3 are utilized.

Impacts are anticipated to be negligible to air quality, and no relevant past, present, or reasonably foreseeable future actions affecting health and safety, or noise were identified; therefore, incremental impacts to these three resources would not contribute to cumulative effects. In addition, the overall effects to socioeconomics and environmental justice would be beneficial; therefore, these two resources would not contribute adversely to cumulative effects.

The incremental effects to land use, biological resources, cultural resources, geology and soils, water resources, transportation, and visual resources, including a determination of significance, are described in the following paragraphs under separate headings. Information in support of the determination is included in Tables 4.2-1 and 4.2-2.

4.2.3.1 Land Use

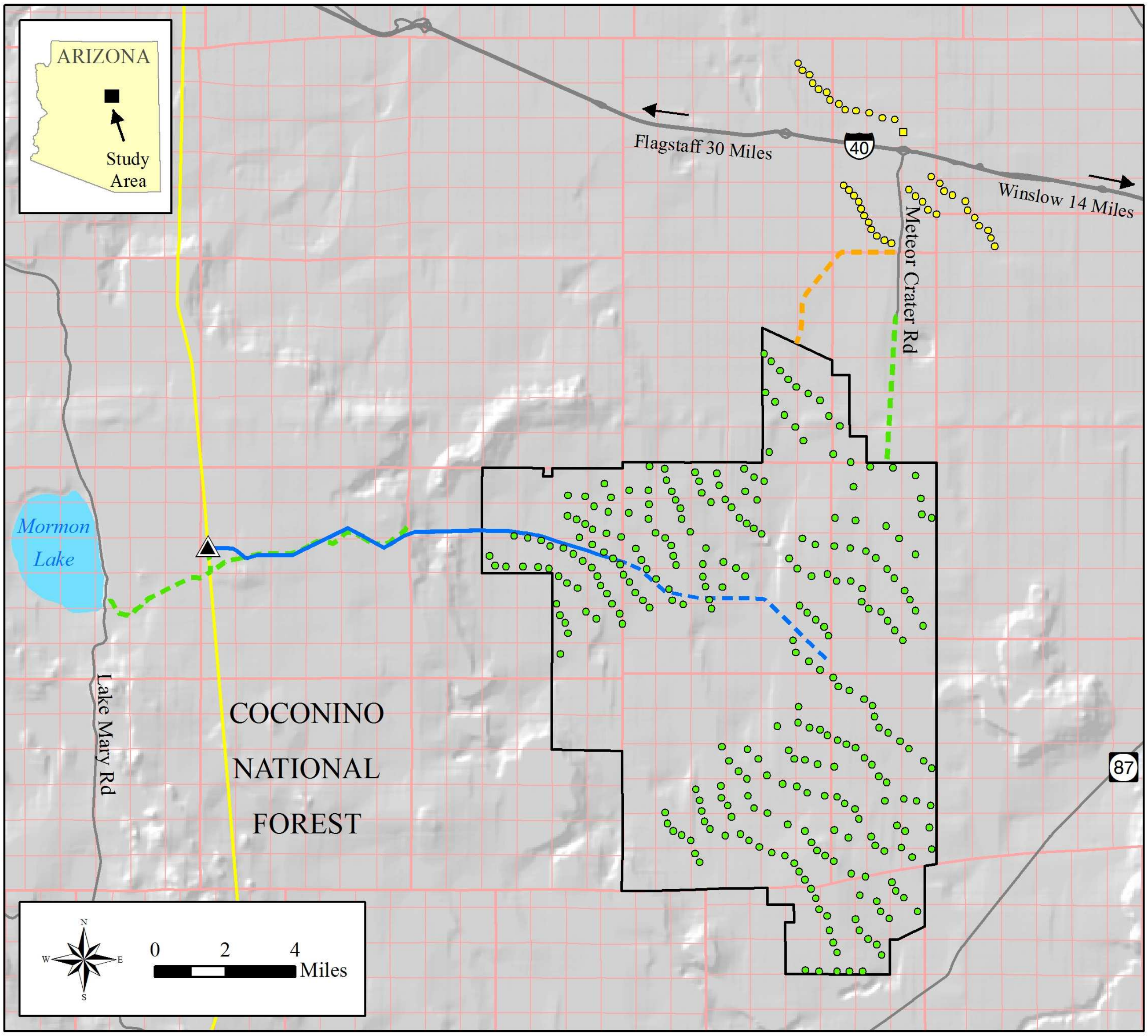
The resource evaluation area for land use included the proposed project components and a two-mile buffer area extending beyond these components. No past actions were identified within this evaluation area. Present actions affecting land use include construction and on-going use of utility infrastructure, operation of Bar T Bar and Flying M ranches, operation of Meteor Crater and Meteor Crater Enterprises, Inc. facilities, and recreation and hunting. These actions have introduced two primary ongoing land uses to the area, including livestock grazing and recreation opportunities.

Future actions affecting land use include the Bar T Bar/Anderson Springs Allotment Management Plan, the proposed Sunshine Wind Project (Figure 4.2-1), and the recently published Travel Management decision that will be implemented in March 2012. These actions would reduce grazing and recreation by reducing the total number of acres available for grazing and range improvements and restrictions on cross-country travel that would reduce access to recreation sites.

The proposed action and alternative action would reduce grazing opportunities by permanently converting approximately 591 to 627 acres of land from grazing to other use if the project is built out to 500 MW. The incremental decrease in the amount of grazing land, when added to other actions, would not affect the economic viability of ranching operations considering the amount of grazing land available and would not result in exceedance of land use significance criteria.

4.2.3.2 Biological Resources

The resource evaluation area for biological resources included the proposed project components and a two-mile buffer area extending beyond these components. No past actions were identified within this evaluation area. Present actions affecting biological resources include construction and on-going use of utility infrastructure, operation of Bar T Bar and Flying M ranches, operation of Meteor Crater and Meteor Crater Enterprises, Inc. facilities, and recreation and hunting. Future actions affecting biological resources are the continued livestock grazing, recreation, and the proposed Sunshine Wind Project.



Legend

- Wind Park Study Area
- Proposed 345-kV Tie-line Alignment
- Proposed Tie-line Extension
- Proposed New Site Access Road
- Existing Site Access Road
- Proposed Interconnection Switchyard
- Existing Western 345-kV Transmission Lines
- Grapevine Wind Turbines (preliminary layout)
- Sunshine Wind Turbines (project layout)
- Sunshine Wind Microwave Relay Station

Sunshine Wind and
Grapevine Canyon Wind Projects

Grapevine Canyon Wind Project

Sources: Foresight 2011, Sunshine Wind 2009

FIGURE 4.2-1

The proposed action and alternative transmission tie-line alignment would result in a permanent conversion of 591–627 acres of land from scrub-shrub, grassland, pinyon/juniper woodlands, and ponderosa pine. This conversion would result in lost habitat for common and special-status species, but when added to other actions, would not result in substantial losses of vegetation or habitat considering the amount of similar land cover in the area and region. These incremental losses would not result in significant cumulative effects.

Temporary construction impacts on wildlife species as a result of the Sunshine Wind Project would be expected to be similar to those of the proposed project; namely, displacement would be short-term and localized, and individuals could return to the area. Upon completion of construction of the proposed project facilities, the level of impact to wildlife would be reduced, even when considered in context of other ongoing or reasonably foreseeable future projects or activities. The long-term effects on wildlife species from the proposed project, in combination with the Sunshine Wind Project, could result in cumulative impacts on wildlife, particularly migratory birds, golden eagles and other raptors, and bats. Past, present, and anticipated developments with aerial features, such as wind turbines and transmission tie-lines, could reasonably cause collisions to increase over current conditions. The areal extent of these projects and the incorporation of mitigation measures to minimize impacts, however, would minimize possible impacts, but still result in incremental cumulative impacts to birds, raptors, and bats. The proposed project, when added to other past, present, and future actions, would result in increased cumulative impacts to birds, raptors, and bats, but would not result in exceedance of biological resources significance criteria.

4.2.3.3 Cultural Resources

The resource evaluation area for cultural resources included the wind park study area and a three-mile buffer and the proposed transmission tie-line and switchyard along with a one-mile buffer extending beyond these two components. No past or present actions were identified within the cultural resources evaluation area. One future action affecting cultural resources was identified, the proposed Sunshine Wind Project. This action would result in ground disturbing activities in the vicinity of Historic Route 66 and areas known to have been used prehistorically and historically. If encountered, ground disturbance could potentially result in the destruction of NRHP-eligible or listed sites. In addition to direct impact to sites, increased access to the area could result in inadvertent disturbance or vandalism to otherwise undisturbed sites. Visual intrusions on TCPs in the region are also likely.

The proposed project and alternative action would directly disturb between 2,419 and 2,630 acres of land within areas known to have been used prehistorically and historically if the proposed project is built out to 500 MW, resulting in the potential for similar impacts to cultural resources as the Sunshine Wind Project. However, the likelihood of this occurring is low because NRHP-eligible and listed sites would be avoided to the extent possible as outlined in the PA. If a site were destroyed, it would be considered a significant impact. Because the proposed action is not likely to destroy any NRHP-eligible or listed sites, there would be no direct contribution to cumulative effect to cultural resources. However, the visible WTGs from both the Grapevine Canyon Wind Project and the Sunshine Wind Project could be perceived as incremental intrusions on a sacred or historic landscape. This incremental increase in visual effects, when added to other actions, would have a cumulative effect on TCPs. However, the significance of any increase cannot be determined until the completion of consultations outlined in the PA and whether or not there would be an intrusion on a TCP determined to be eligible to the NRHP.

4.2.3.4 Geology and Soils

The resource evaluation area for geology and soils included the footprint of the proposed project components. No past actions were identified within this evaluation area. Present actions affecting geology and soils include operation of Bar T Bar and Flying M ranches and recreation and hunting. These actions have affected soil protective mechanisms causing erosion and lost productivity. Future actions affecting geology and soils include the Bar T Bar/Anderson Springs Allotment Management Plan and the Forest's proposed TMR. These actions would lead to increases in ground cover which would decrease erosion.

The proposed project would temporarily disturb between 2,419 and 2,630 acres of land and would permanently remove vegetation from and alter the surface of 591 to 627 acres of land if the project is built out to 500 MW. This would result in increased erosion and the permanent loss of a minimal volume of soils. This incremental effect on geology and soils would not cause appreciable, accelerated soil erosion or cause long-term, negative impacts to rangeland or wildlife habitat. Applicable geology and soils significance standards would not be exceeded.

The alternative action would temporarily disturb between 2,420 and 2,631 acres of land and would permanently alter the surface and remove vegetation from 592 to 628 acres of land if the project is built out to 500 MW. Impacts would be slightly greater than under the proposed action because the transmission tie-line associated with the alternative action requires a new access road across moderately erosive soils that would be difficult to revegetate leading to increased soil erosion. Though the alternative action would lead to slightly greater soil erosion, the incremental effect, when added to other actions, would not result in appreciable, accelerated soil erosion or cause long-term, negative impacts to rangeland or wildlife habitat, and applicable geology and soils significance standards would not be exceeded.

4.2.3.5 Water Resources

The resource evaluation area for water resources included the proposed project components and a one-mile buffer area extending beyond these components. In addition, drainages and aquifers were included in order to understand the potential for indirect impacts. No past actions were identified within the evaluation area. Present actions affecting water resources include community settlement and development and the operation of Bar T Bar and Flying M ranches. Water is consumed in Coconino County by municipal, industrial, and agricultural activities at a rate of approximately 105,000 acre-feet of groundwater and 51,000 acre-feet of surface water annually. In addition, these actions affect water quality by increasing erosion and sedimentation as a result of grazing and other ground disturbing activities.

Future actions affecting water resources include the Bar T Bar/Anderson Springs Allotment Management Plan and the proposed Sunshine Wind Project. These actions would increase erosion and sedimentation and would consume a relatively small amount of water.

The proposed project and alternative action would require up to approximately 307 acre-feet of groundwater if the project is built out to 500 MW in one or more phases. Project operation and maintenance would require a negligible amount of water. This incremental amount of water, when added to other actions, would not substantially deplete groundwater resources and applicable water resources significance standards would not be exceeded.

The proposed action would temporarily disturb between 2,419 and 2,630 acres of land and would permanently disturb between 591 and 627 acres of land if built out to 500 MW. The alternative action would disturb between 2,420 and 2,631 acres of land and would permanently disturb between 592 and 628 acres of land. The difference in the amount of ground disturbance is negligible between the two. Ground disturbance would lead to an increase in soil erosion and sedimentation. The incremental increase in sedimentation, when added to other actions, would not substantially degrade water quality, and applicable significance standards would not be exceeded.

4.2.3.6 Transportation

The resource evaluation area for transportation included the proposed project components and a one-mile buffer area extending beyond these components. In addition, the primary access routes that would be used for employees accessing the project components and for the delivery of equipment and materials are included as part of the evaluation area. No past actions were identified within this evaluation area. Present actions affecting transportation include the use of I-40 and the State highway system. These actions have established a system of County and Forest Service roads that are considered adequate.

One future action was identified that would affect transportation, the Forest's proposed TMR. This action would designate a system of roads on the Forest and restrict cross-country travel.

The proposed project and alternative action would result in a short-term (12 to 18 month) increase in construction related traffic of over 400 two-way vehicle trips each day on I-40 and Meteor Crater Road during peak construction activity and approximately 25 two-way vehicle trips each day on Lake Mary Road and FS 125 for a typical project phase of up to 250 MW. Over the long-term, the number of vehicles using I-40 and Meteor Crater Road daily for operations and maintenance would increase. This incremental increase in traffic, when added to other actions, would not result in a permanent disruption of local or regional traffic, and applicable transportation significance thresholds would not be exceeded.

4.2.3.7 Visual Resources

The resource evaluation area for visual resources extends three miles in all directions from the proposed wind park and extends north to I-40. In addition, the visual resources evaluation area extends one mile to either side of the proposed transmission tie-line and Western switchyard. No past actions were identified within this evaluation area. Present actions affecting visual resources include the construction and on-going use of utility infrastructure. These actions have introduced contrasting elements of form, line, and color into a naturally appearing setting.

One future action, the proposed Sunshine Wind Project, would affect visual resources within this evaluation area (see Figure 4.2-1). This action would introduce contrasting elements of form, line, and color over a large area and reduce the quality of background views from I-40. Additionally, the development of the Sunshine Wind Project would actually minimize the direct visual impact of the proposed wind park by introducing similar elements in closer proximity to the greatest number of viewers near I-40.

The proposed project would result in a visual contrast by introducing contrasting elements of form, line, and color over a large area. The incremental effect of the proposed wind park, together with other actions, would result in a substantial visual contrast to the area. This contrast would not conflict with the goals and policies of the Coconino County General Plan. The proposed transmission tie-line would be located within an area on Forest Service-managed lands managed with a VQO of Partial Retention. The presence of the transmission tie-line would not meet the VQO of Partial Retention, as prescribed by the Forest Plan, and would result in a movement down one level to a VQO of Modification. This contrast would be a negative incremental impact to visual resources on Forest Service-managed lands, although applicable visual resources significance standards would not be exceeded.

The alternative transmission tie-line would be routed to avoid the more sensitive area (Partial Retention) on Forest Service-managed lands and would not alter the VQOs prescribed by the Forest Plan. Therefore, incremental impacts associated with the alternative transmission tie-line would be minimal and visual resources significance standards would not be exceeded.

CHAPTER 5: LIST OF AGENCIES, ORGANIZATIONS, AND INDIVIDUALS PROVIDED DRAFT EIS

5.1 FEDERAL AGENCIES

- National Marine Fisheries Service, Habitat Conservationists Division
- U.S. Department of Agriculture, Coconino National Forest, Supervisor's Office
- U.S. Department of Agriculture, National Agricultural Library
- U.S. Department of the Interior, Fish and Wildlife Service, Flagstaff Office
- U.S. Department of the Interior, Office of Environmental Policy and Compliance
- U.S. Department of Transportation, Office of Environment and Energy
- U.S. Environmental Protection Agency, Department of Energy Reviewer, San Francisco, CA
- U.S. Environmental Protection Agency, Office of Federal Activities, Washington, DC
- U.S. Environmental Protection Agency, Region 9
- Western Area Power Administration, Desert Southwest Regional Office

5.2 STATE AGENCIES

- Arizona Department of Environmental Quality
- Arizona Game and Fish Department, Flagstaff Office
- Arizona Game and Fish Department, Phoenix Office
- Arizona State Land Department

5.3 LOCAL AGENCIES

- Coconino County
- City of Flagstaff
- Flagstaff City – Coconino County Public Library
- Winslow Public Library

5.4 NATIVE AMERICAN TRIBES AND COMMUNITIES

- Fort McDowell Yavapai Nation
- The Havasupai Tribe
- The Hopi Tribe
- The Hualapai Tribe
- The Navajo Nation
- The Pueblo of Acoma
- Pueblo of Zuni
- San Carlos Apache Tribe
- San Juan Southern Paiute Tribe
- Tonto Apache Tribe
- White Mountain Apache Tribe
- The Yavapai-Apache Nation
- The Yavapai-Prescott Indian Tribe

5.5 ORGANIZATIONS

- Bar T Bar Ranch, Inc.
- Edison Mission Energy
- Meteor Crater Enterprises
- Northern Arizona University
- Rubestrian Cyberservices

5.6 INDIVIDUALS

- Aaron Alvidrez
- Bill Auberle
- Ken Berkhoff
- Ken Jacobs
- Roger Tungovia
- Sandra Nagiller
- Scott Harger
- Ty Rock
- U.S. Senator Jon Kyl

CHAPTER 6: LIST OF PREPARERS

This EIS was prepared under the supervision of Western with cooperation from the Forest Service and ASLD with technical assistance provided by Transcon Environmental, an environmental consulting firm. Contributors to the EIS include:

TABLE 6.1-1
LIST OF PREPARERS

Name	Responsibilities	Education	Experience (years)
WESTERN AREA POWER ADMINISTRATION			
Mary Barger	NEPA review, Tribal consultation	B.A. Anthropology	27
Matthew Blevins	NEPA Document Manager, NEPA compliance review	M.S. Environmental Engineering, B.S. Chemistry	14
John Bridges	Biological resources	B.S., M.S. Zoology	27
Cathy Cunningham	NEPA compliance review	B.S. Animal Science	
Michael Garcia	Project Manager, switchyard technical review	B.S. Business	30
Dave Swanson	QA/QC, NEPA compliance, technical review	B.A. Biological Sciences	33
Steve Tromly	Tribal consultation	M.A. Anthropology, B.S. Resource Conservation	18
Randy Wilkerson	Public involvement, media relations	B.A. Botany	18
COCONINO NATIONAL FOREST			
Judy Adams	Land Use/Special Uses	B.S. Forestry	24
Jim Beard	Visual resources	B.L.A Environmental Design	31
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Mike Dechter	NEPA Compliance	M.S. Environmental Management B.S. Ecology	6
Yewah Lau	Forest Planner, NEPA Review	B.A. Biology, M.E.M. Resource Economics/Policy	7
Cecilia Overby	Biological Resources	M.S. Forestry B.S. Biology	22
Christine Paulu	NEPA compliance, technical review	B.S. Mathematics/Environmental Studies, M.S. Forestry	1.5
Peter Pilles	Cultural resources	B.A. Anthropology	43
Henry Provencio	Biological resources	B.S. Wildlife Conservation Biology	10
Rory Steinke	Water resources, geology and soils	B.S. Soil Science	27
TRANSCON ENVIRONMENTAL, INC.			
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TABLE 6.1-1 LIST OF PREPARERS			
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Clark Bryner	Purpose and Need, Proposed Action and Alternatives, health and safety, cumulative impact analysis, summary, data consistency	M.S. Bioregional Planning; B.A. Geography	6
Jan Bush, AICP	Water resources, wetlands and floodplains, geology and soils, public comment and response	M.A. Environmental Planning	14
Melanie CollinsBriggs	Biological review	B.S. Biology	4
Jeff Davis, ALA	Visual resources	M.L.A. Landscape Architecture/Environmental Planning; B.S. Conservation Biology: Resource Management	13
Debra Duerr	NEPA compliance, technical review	B.A. Urban Affairs	25
Heather Duncan	Cultural resources	B.A. Anthropology	9
Marlon Haddix	Graphic design	B.A. Graphic Design	5
George Miller, AICP	Project Manager, Proposed Action and Alternatives, QA/QC, NEPA compliance, noise	M.A. Urban and Regional Planning, B.A. Environmental Studies	21
Mike McClellan	Visual resources, simulations	B.A. Landscape Architect	12
Myriah Moore	Administrative Record, technical review	B.A. Archaeology	5
Susan Morrison	Land use, transportation	M.S. Planning; B.S. Geography	7
John Papageorgiou	GIS mapping	M.A. Classical Archaeology; B.A. Ancient Civilizations	15
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Mike Shrum	Biological review, air quality	B.S. Ecology	5

TABLE 6.1-2 FORESIGHT'S CONSULTANTS			
Name	**Responsibilities**	**Education**	**Experience (years)**
WESTERN ECOSYSTEMS TECHNOLOGY, INC.			
David Tidhar	Biological resources	M.S. Ecology, B.A. History and Political Science	12
David Young	Biological resources	M.S. Zoology, B.A. Biology	20
MONTGOMERY AND ASSOCIATES			
Bill Victor	Water resources	M.S. Hydrology, B.S. Geology	33

TABLE 6.1-2 FORESIGHT'S CONSULTANTS			
Name	**Responsibilities**	**Education**	**Experience (years)**
ERM – ENVIRONMENTAL RESOURCES MANAGEMENT			
Robert Farmer, Ph.D.	Emissions assessment and abatement	Ph.D. Chemical Engineering	23
ATWELL LLC			
Kevin Kammerzell, P.E.	Jurisdictional waters evaluation	B.S. Civil Engineering	20

CHAPTER 7: DISCLOSURE STATEMENT

Organizational Conflict of Interest Representation Statement

I hereby certify as a representative of my organization that, to the best of my knowledge and belief, no facts exist relevant to any past, present, or currently planned interest or activity (financial, contractual, personal, organizational, or otherwise) that relate to the proposed work and bear on whether I or the organization has a possible conflict of interest with respect to (1) being able to render impartial, technically sound, and objective assistance or advice; (2) being given an unfair competitive advantage; or (3) having a financial interest in the outcome of the project.

Signature: ______________________ Date: July 8, 2010

Name: George Miller

Title: Vice President

Organization: Transcon Environmental, Inc.

CHAPTER 8: REFERENCES

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CHAPTER 9: GLOSSARY

Aerodynamics: The study of the forces exerted on and the flow around solid objects moving relative to a gas, especially the atmosphere.

Aesthetics: Referring to the perception of beauty.

Affected Environment: Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.

Aggregate: Mineral materials such as sand, gravel, crushed stone, or quarried rock used for construction purposes.

Air Quality Standards: The level of pollutants prescribed by regulation that may not be exceeded during a specified time in a defined area.

Allotment: The area designated for use by a prescribed period of time.

American Indian Religious Freedom Act of 1978 (AIRFA): This act requires Federal agencies to consult with Tribal officials to ensure protection of religious cultural rights and practices.

Animal Unit (AU): A measure of numbers of livestock equivalent to a mature cow. One AU equals 1,000 pounds live weight, or one cow, horse, or mule; five sheep or swine; six goats.

Animal Unit Month (AUM): A measure of forage or feed sufficient to feed one Animal Unit for 30 days; usually expressed relative to acres of land.

Archaeological Resources Protection Act: A Federal law, passed in 1979 (16 USC 1B, Pub. L. 96-95) to protect archaeological resources on public and Indian lands.

Archaeological Site: Any location where humans have altered the terrain or discarded artifacts during prehistoric or historic times.

Archaeology: A scientific approach to the study of human ecology, cultural history, and cultural process.

Area of Potential Effect: The area in which disturbance to cultural resources may occur and within which a systematic cultural resource inventory is required.

Artifact: An object produced or shaped by human workmanship of archaeological or historical interest.

Attainment Area: An area which the U.S. Environmental Protection Agency (EPA) has designated as being in compliance with one or more of the National Ambient Air Quality Standards (NAAQS) for sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter. Any area may be in attainment for some pollutants but not for others.

Average Daily Traffic (ADT): The average volume of vehicles at a given point or section of highway over a 24-hour period.

Avian Monitoring Study: A study done to characterize and monitor the quality of avian species. Avian monitoring studies are used in the preparation of impact assessments, as well as in many circumstances in which human activities carry a risk of harmful effects on avian species natural environment.

Avian Power Line Interaction Committee (APLIC): Committee that works in partnership with other utilities, resource agencies and the public to develop and provide educational resources, identify and fund research, develop and provide cost-effective management options, and serve as the focal point for avian interaction utility issues.

Arizona Pollution Discharge Elimination System (AZPDES) Permit: Federal regulation (40 CFR Parts 122 and 125) administered by the State of Arizona that requires permits for the discharge of pollutants from any point source into the Waters of the United States regulated through the Clean Water Act, as amended.

Arizona State Historic Preservation Office (SHPO): The State Historic Preservation Office manages the National Register of Historic Places program of the National Park Service in Arizona. The program surveys, inventories, and registers historical properties; monitors State, Federal, and local government activities which affect cultural and historic resources; provides advice on preservation methods; promotes public education on historical properties; and supports municipal and county historic preservation commissions to advance the State's economic, social, and educational objectives.

Aquifer: A permeable underground formation that yields usable amounts of water to a well or spring. The formation could be sand, gravel, limestone, and/or sandstone.

Array (turbine): The positioning and spatial arrangement of wind turbines relative to each other.

Background: The distant part of a landscape. The landscape area located from four miles to infinity from the viewer.

Bald and Golden Eagle Protection Act (BGEPA): A Federal law enacted in 1940 and amended several times, prohibits anyone, without a permit from the Secretary of the Interior, from "taking" bald and golden eagles, including their parts, nests, or eggs.

Batch Plant: Mixing plant that produces batches of concrete or aggregate-asphalt mixture, off-site or at the site of another plant.

Berm: A mound or bank of earth, used especially as a barrier or to provide insulation.

Best Management Practices (BMPs): Structural and/or management practices employed before, during, and after construction to protect receiving-water quality. These practices provide techniques to either reduce soil erosion or remove sediment and pollutants from surface runoff.

Biological Assessment (BA): An evaluation of potential effects of a proposed project on proposed, endangered, threatened, and sensitive animal and plant species and their habitats. Information prepared by, or under the direction of, a Federal agency to determine whether a proposed action is likely to adversely affect listed species or designated critical habitat, jeopardize the continued existence of species that are proposed for listing, or adversely modify proposed critical habitat.

Borrow Pit: A pit or excavation area used for gathering earth materials (borrow) such as sand or gravel.

Breaker: A switching device that is capable of closing or interrupting an electrical circuit under over-load or short-circuit conditions as well as under normal load conditions.

Bus: A set of two or more electrical conductors that serve as common connections between load circuits and each of the phases (in alternating current systems) of the electric power source.

Carbon monoxide (CO): A colorless, odorless gas that is toxic if breathed in high concentrations over an extended period. Carbon monoxide is listed as a criteria air pollutant under Title I of the Clean Air Act.

Clean Air Act (CAA): This act establishes national ambient air quality standards and requires facilities to comply with emission limits or reduction limits stipulated

Clean Water Act (Section 404): The Federal Water Pollution Control Act Amendments of 1972 (33 USC 401 et seq.) is the enabling legislation for protection of Waters of the United States by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency.

Code of Federal Regulations (CFR): A compilation of the general and permanent rules published in the Federal Register by the executive departments and agencies of the United States. It is divided into 50 titles that represent broad areas subject to Federal regulation. Each volume of the CFR is updated once each calendar year and is issued on a quarterly basis.

Color: The property of reflecting light of a particular wavelength that enables the eye to differentiate otherwise indistinguishable objects. A hue (red, green, blue, yellow, and so on), as contrasted with a value (black, white, or gray).

Cone of Depression: A depression in the water table that develops around a pumped well.

Contrast: Diversity or distinction of adjacent parts. Effect of striking differences in form, line, color, or texture of a landscape.

Corona/corona noise: The electrical breakdown of air into charged particles. The phenomenon appears as a bluish-purple glow on the surface of and adjacent to a conductor when the voltage gradient exceeds a certain critical value, thereby producing light, audible noise (described as crackling or hissing), and ozone.

Council on Environmental Quality (CEQ): Established by the National Environmental Policy Act (NEPA), the CEQ consists of three members appointed by the President. A CEQ regulation (Title 40 CFR 1500-1508, as of July 1, 1986) describes the process for implementing NEPA, including preparation of Environmental Assessments and Environmental Impacts Statements, and the timing and extent of public participation.

Criteria Pollutants: An air pollutant that is regulated by the NAAQS. The EPA must describe the characteristics and potential health and welfare effects that form the basis for setting or revising the standard for each regulated pollutant. Criteria pollutants include sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter.

Culvert: A pipe or covered channel that directs surface water through a raised embankment or under a roadway from one side to the other.

Cumulative Impact: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Day-night noise level (Ldn): The day-night average sound level. It is the average A-weighted sound level over a 24-hour period that gives additional weight to noise that occurs during the night (10:00 p.m. to 7:00 a.m.).

Decibel (dB): A standard unit for measuring the loudness or intensity of sound. In general, a sound doubles in loudness with every increase of ten decibels.

Decibel, A-Weighted [dB (A)]: A measurement of sound approximating the sensitivity of the human ear and used to characterize the intensity of loudness of a sound.

Decommissioning: All activities necessary to take out of service and dispose of a facility after its useful life.

Direct Effects: The immediate effects on the social, economic, and physical environment caused by the construction and operation of a highway. These impacts are usually experienced within the right-of-way or in the immediate vicinity of the highway or another element of the proposed action.

Dispersed Recreation: Outdoor recreation in which visitors are diffused over relatively large areas. Where facilities or developments are provided, they are primarily for access and protection of the environment rather than comfort or convenience of the user.

Distance Zones: Landscape areas denoted by specified distances from the observer. Used as a frame of reference in which to discuss landscape attributes or the scenic effect of human activities in a landscape.

Electric and Magnetic Fields (EMF): The invisible lines of force associated with the production, transmission, and use of electric power, such as those associated with high-voltage transmission lines, secondary power lines, and home wiring and lighting. EMFs are present around any electrical device.

Electromagnetic Fields: Electromagnetic fields are generated when charged particles (e.g., electrons) are accelerated. Charged particles in motion produce magnetic fields. Electromagnetic fields are typically generated by alternating current in electrical conductors. They are also referred to as EM fields.

Eligible Cultural Resource: A cultural resource that has been evaluated and reviewed by an agency and the State Historic Preservation Officer and recommended as eligible for inclusion in the National Register of Historic Places, based on the criteria of significance.

Endangered Species: Any species (plant or animal) that is in danger of extinction throughout all, or a significant part of, its range. Requirements for declaring a species endangered are found in the Endangered Species Act.

Endangered Species Act of 1973 (ESA): This act requires consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service to determine if endangered or threatened species or their habitats will be impacted by a proposed activity and what, if any, mitigation measure are needed to address the impacts.

Environmental Impact Statement (EIS): A document required of Federal agencies by the National Environmental Policy Act for major proposals or legislation that will or could significantly affect the environment.

Environmental Justice: The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Ephemeral Stream: Streams that contain running water only sporadically, such as during and following storm events.

Equivalent sound level (Leq): For sounds that vary with time, Leq is the steady sound level that would contain the same total sound energy as the time-varying sound over a given time.

Erosion: The wearing away of the land surface by wind and water.

Federal Land Policy and Management Act of 1976: This act requires the Secretary of the Interior to issue regulations to manage public lands and the property located on those lands for the long term.

Floodplain: The lowlands adjoining inland and coastal waters and relatively flat areas, including at a minimum that area inundated by a one percent or greater chance flood in any given year. The base floodplain is defined as the 100-year (1.0 percent) floodplain. The critical action floodplain is defined as the 500-year (0.2 percent) floodplain.

Foreground: The part of a scene or landscape that is nearest to the viewer. Detailed landscape generally found from the observer to one-half mile away.

Form: Structure, mass, or shape of a landscape or of an object. Landscape form is often defined by edges or outlines of landforms, rockforms, vegetation patterns, waterforms, or the enclosed spaces created by these attributes.

Fugitive Dust: The dust released from activities associated with construction, manufacturing, or transportation.

Gauss (G): The unit most commonly used in the United States to measure magnetic fields.

Groundwater: Water within the earth that supplies wells and springs.

Harmonic Mean: The harmonic mean (formerly sometimes called the subcontrary mean) is one of several kinds of average. Typically, it is appropriate for situations when the average of rates is desired.

Hazardous Material: Any material that poses a threat to human health and/or the environment. Hazardous materials are typically toxic, corrosive, ignitable, explosive, or chemically reactive.

Hertz (Hz): The unit of measurement of frequency, equivalent to one cycle per second.

Historic Properties: Any prehistoric or historic districts, sites, buildings, structures, or objects included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. They include artifacts, records, and remains that are related to and located within such properties.

Immediate Foreground: The detailed feature landscape found within the first few hundred feet of the observer, generally, from the observer to 300 feet away. This distance zone is normally used in project level planning, not broad scale planning.

Indicator Species: A plant or animal species related to a particular kind of environment. Its presence indicates that specific habitat conditions are also present.

Indirect Effects: Effects caused by a given action occurring later in time or farther removed in distance but that are reasonably foreseeable (e.g., induced changes to land-use patterns, population density, and growth rate).

Irretrievable: Applies to losses of production, harvest, or commitment of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a Winter sports site. If the use is changed, timber production can be resumed.

Irreversible: Describes the loss of future options; applies primarily to the effects upon or use of nonrenewable resources, such as mineral or cultural resources, or to those factors, such as soil productivity, that are renewable only over long periods of time.

Key Observation Point (KOP): An element of the contrast rating system used by Federal agencies to analyze the potential visual impact of proposed projects and activities. The rating is done from the most critical viewpoints, or Key Observation Points. Factors that should be considered in selecting KOPs are: angle of observation, number of viewers, length of time the project is in view, relative project size, season of use, and light conditions.

Kilovolt (kV): The electrical unit of power that equals 1,000 volts.

Landscape Character: Particular attributes, qualities, and traits of a landscape that give it an image and make it identifiable or unique.

Lead (Pb): A gray-white metal that is listed as a criteria air pollutant. Health effects from exposure to lead include brain and kidney damage and learning disabilities. Sources include leaded gasoline and metal refineries.

Level of Service: A qualitative measure describing operational conditions in a traffic stream and their perception by motorists and/or passengers.

Line: An intersection of two planes; a point that has been extended; a silhouette of form. In landscapes, ridges, skylines, structures, changes in vegetation, or individual trees and branches may be perceived as a line.

Management Indicator Species (MIS): MIS are identified in the Forest Service Land and Resource Management Plans of each national forest and are generally identified to represent species and habitat types that occur within the national forest boundary and/or because they are thought to be sensitive to National Forest System management activities.

Maximum Modification: A Visual Quality Objective meaning man's activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background.

Megawatt (MW): The electrical unit of power that equals one million watts or one thousand kilowatts.

Middleground: A term used in the management of visual resources, or scenery. It refers to the visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly from the stand.

Migratory Bird Treaty Act (MBTA): Establishment of a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention for the protection of migratory birds or any part, nest, or egg of any such bird." (16 U.S.C. 703)

Mitigation: The alleviation of adverse impacts on environmental resources by avoidance through project redesign or project relocation, by protection, or by adequate scientific study.

Mitigation Measures: Specific design commitments made during the environmental evaluation and study process that serve to moderate or lessen impacts deriving from a proposed action. In accordance with CEQ Regulations, mitigation includes avoidance, minimization, rectification, reduction, and compensation.

Modification: A Visual Quality Objective meaning man's activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

Nacelle: The housing that protects the major components (e.g., generator and gear box) of a wind turbine.

National Ambient Air Quality Standards (NAAQS): Air quality standards established by the Clean Air Act, as amended. The primary National Ambient Air Quality Standards specify maximum outdoor air concentrations of criteria pollutants that would protect the public health within an adequate margin of safety. The secondary National Ambient Air Quality Standards specify maximum concentration that would protect the public welfare from any known or anticipated adverse effects of a pollutant.

National Environmental Policy Act (NEPA): This Act (42 U.S.C. 4341, passed by Congress in 1975) established a national policy designed to encourage consideration of the influences of human activities (e.g., population growth, high-density urbanization, industrial development) on the natural environment. NEPA also established the CEQ. NEPA procedures require that environmental information be made available to the public before decisions are made. Information contained in NEPA documents must focus on the relevant issues in order to facilitate the decision-making process.

National Historic Preservation Act of 1996 (NHPA): This act requires Federal agencies to prepare a detailed statement on the environmental impacts of their proposed major actions significantly affecting the quality of the human environment.

National Forest Management Act: A Law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring the preparation of forest plans and the preparation of regulations to guide that development.

National Register of Historic Places (NRHP): The NRHP is the official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

National Resources Conservation Service (NRCS): Formerly the Soil Conservation Service, NRCS is a department in the U.S. Department of Agriculture responsible for administering the Farmland Protection Policy Act.

National Wetlands Inventory (NWI): A series of maps produced by U.S. Fish and Wildlife Service (USFWS) to show wetlands and deepwater habitats to illustrate reconnaissance level information on the location, type, and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology, and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

Native American Graves Protection and Repatriation Act (NAGPRA): This act established the priority for ownership or control of Native American cultural items excavated or discovered on Federal or Tribal land after 1990 and the procedures for repatriation of items in Federal possession. The act allows the intentional removal from or excavation of Native American cultural items from Federal or Tribal lands only with a permit or upon consultation with the appropriate tribe.

Nitrogen dioxide (NO_2): A toxic reddish brown gas that is a strong oxidizing agent, produced by combustion (as of fossil fuels). It is the most abundant of the oxides of nitrogen in the atmosphere and plays a major role in the formation of ozone.

Nonattainment Area: An area that the EPA has designated as not meeting (that is, not being in attainment of) one or more of the NAAQS for criteria pollutants. An area may be in attainment for some pollutants, but not others.

Non-renewable Resources: Resources that are in limited supply, such as oil, coal, and natural gas.

Noxious Weeds: Plant species that have been designated by State or national agricultural authorities as a plant that is injurious to agricultural and/or horticultural crops and/or humans and livestock. Most have been introduced into a foreign ecosystem either by accident or mismanagement, but some are also native species. Typically they are plants that are grow aggressively, multiply quickly, and adversely affect desirable plants, or are somehow injurious to livestock or humans either by contact or when ingested.

Occupational Health and Safety Administration (OSHA): Congress created the Occupational Safety and Health Administration under the Occupational Safety and Health act on December 29, 1970. Its mission is to prevent work-related injuries, illnesses, and deaths.

Ozone (O_3): A strong-smelling, reactive toxic chemical gas consisting of three oxygen atoms chemically attached to each other. It is formed in the atmosphere by chemical reactions involving nitrogen oxide and volatile organic compounds. The reactions are energized by sunlight. Ozone is a criteria air pollutant under the Clean Air Act and is a major constituent of smog.

Paleontological Resources: Any remains, trace, or imprint of a plant or animal that has been preserved in the earth's crust since some past geologic time.

Paleontology: The study of plant and animal life that existed in former geologic times, particularly through the study of fossils.

Partial Retention: A Visual Quality Objective which in general means man's activities may be evident but must remain subordinate to the characteristic landscape.

Particulate matter (PM_{10} and $PM_{2.5}$): Fine solid or liquid particles, such as dust, smoke, mist, fumes, or smog found in air or emissions. The size of the particulates is measured in micrometers (µm). One micrometer is 1 millionth of a meter or 0.000039 inch. Particle size is important because the U.S. Environmental Protection Agency has set standards for $PM_{2.5}$ and PM_{10} particulates.

Perennial Streams: A stream that typically has running water on a year-round basis.

Potable Water: Water that is safe for drinking and cooking.

Programmatic Agreement (PA): A document that records the terms and conditions agreed upon to resolve the potential adverse effects of a Federal agency program, complex undertaking, or other situations in accordance with Section 800.14 (b), "Programmatic Agreements," of 36 CFR Part 800, "Protection of Historic Properties."

Range: Land on which the principle natural plant cover is composed of native grasses, forbs, and shrubs that are valuable as forage for livestock and big game.

Range Management: The art and science of planning and directing range use intended to yield the sustained maximum animal production and perpetuation of the natural resources.

Record of Decision (ROD): A concise public document that records a Federal agency's decision(s) concerning a proposed action for which the agency has prepared, or cooperated in the preparation of an EIS. The Record of Decision (ROD) is prepared in accordance with the requirements of the CEQ NEPA regulations (40 CFR 1505.2).

Renewable Energy: Alternative energy sources such as wind power or solar energy that can keep producing energy indefinitely without being used up.

Resource Evaluation Area: The geographical region that would be expected to be affected in some way by a proposed action and alternatives.

Resource Protection Measures (RPM): Mitigation measures built into a project's design and construction standards that (1) avoid impacts by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the action and its implementation; (3) rectify impacts by repairing, rehabilitating or restoring the affected environment; or (4) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action.

Right-of-way: Land acquired by purchase, gift, or eminent domain to build and maintain a public road, bridge, railroad, or public utility.

Riparian: Relating to, living in, or located on the bank of a river, lake or tidewater.

Rock Crusher: A machine designed to reduce large rocks into smaller rocks, gravel, or rock dust. Crushers may be used to reduce the size, or change the form of, waste materials so they can be more easily disposed of or recycled, or to reduce the size of a solid mix of raw materials

Rotational Speed: The rate (in revolutions per minute) at which a turbine blade makes a complete revolution around its axis. Wind turbine speeds can be fixed or variable.

Rotor: The portion of a modern wind turbine that interacts with the wind. It is composed of the blades and the central hub to which the blades are attached.

Rotor Diameter: The diameter of the circular area that is swept by the rotating tip of a wind-turbine blade. It is equal to twice the blade length.

Runoff: The portion of rainfall, melted snow, or irrigation water that flows across the ground surface and may eventually enter streams.

Scenery Integrity: State of naturalness or, conversely, the state of disturbance created by human activities or alteration. Integrity is stated in degrees of deviation from the existing landscape character in a national forest.

Scenery Management: The art and science of arranging, planning, and designing landscape attributes relative to the appearance of places and expanses in outdoor settings.

Scoping: An early, open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.

Section 7 of the Endangered Species Act (ESA): The section of the Endangered Species Act that requires all Federal agencies, in "consultation" with the U.S. Fish and Wildlife Service, to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

Section 106 National Historic Preservation Act: Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR 800) require Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The purpose of the Section 106 process is to identify, evaluate, and protect cultural resources eligible for listing in the NRHP that may be affected by Federal actions or undertakings (16 U.S.C. §470 et seq.).

Sedimentation: The process of deposition of sediment, especially by mechanical means from a state of suspension in water.

Sensitive Species: Those plants and animals for which population viability is a concern, as shown by a significant current or predicted downward trend in populations or density and significant or predicted downward trend in habitat capability.

Septic Tank: An underground storage tank for wastes from homes having no sewer line to a treatment plant. The wastes go directly from the home to the tank, where the organic waste is decomposed by bacteria and the sludge settles to the bottom. The effluent flows out of the tank into the ground through drains; the sludge is pumped out periodically.

Significant Impacts: Any number of social, environmental, or economic effects or influences that may occur as a result of the implementation of a transportation improvement. "Significant impacts" may include effects that are direct, secondary, or cumulative.

Soil Compaction: An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

Specific Yield: The ratio of the volume of water a rock or soil will yield by gravity drainage to the total volume of the rock or soil.

Spill Prevention, Control, and Countermeasures (SPCC) Plan: A plan implemented to help prevent any discharge of oil into navigable waters or adjoining shorelines.

Step-up Substation: A transformer substation in which the outgoing power from the transformers is at a higher voltage than the incoming power.

Storm Water Pollution Prevention Plan (SWPPP): A plan required to be implemented for construction projects disturbing more than one acre of land. Implementation of a SWPPP is a requirement to obtain a State pollutant discharge elimination system permit coverage for storm water discharges.

Substation: A facility where electric energy is passed for transmission, transformation, distribution, or switching.

Sulfur dioxide (SO_2): A gas formed from burning fossil fuels. Sulfur dioxide is one of the six criteria air pollutants specified under Title I of the Clean Air Act.

Sulfur hexafluoride (SF_6): A colorless, odorless gas considered by the Intergovernmental Panel on Climate Change to be one of the more potent greenhouse gases (GHGs) in the atmosphere. SF_6 is used in electrical equipment, such as circuit breakers.

Supervisory Control and Data Acquisition (SCADA): A software program used to communicate directly with individual wind turbines to monitor performance, report energy output, and trouble-shoot technical difficulties.

Surface Water: All bodies of water on the surface of the earth and open to the atmosphere, such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

Switchgear: A group of switches, relays, circuit breakers, etc. used to control distribution of power to other distribution equipment and large loads.

Switchyard: Facility with circuit breakers and automatic switches to turn power on and off on different transmission lines. Switchyards are typically associated with substations.

Texture: The visual or tactile surface characteristics of something.

Traditional Cultural Property (TCP): A property or site that is eligible for inclusion on the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that are rooted in that community's history and are important to maintaining the continuing cultural identity of the community.

Transmission Line: The structures, insulators, conductors and other equipment used to transfer electrical power from one point to another.

Transmissivity: The ability of an aquifer to transmit water.

Transformer: A device for transferring electric power from one circuit to another in an alternating current system. Transformers are also used to change voltage from one level to another.

Viewshed: The total landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body.

Visual Management System (VMS): The planning methodology, published in 1974 that guided the management of visual resources on throughout lands managed by the Forest Service until the Scenery Management System was published in 1995.

Visual Quality Objective (VQO): A desired level of excellence based on physical and sociological characteristics of an area. Refers to degree of acceptable alteration of the characteristic landscape.

Visual Resource: The visible physical features of a landscape.

Waters of the United States: As defined by the Clean Water Act, Waters of the United States applies only to surface waters, rivers, lakes, estuaries, coastal waters, and wetlands. Waters of the United States include all interstate waters, intrastate waters used in interstate and/or foreign commerce, tributaries of the above, territorial seas at the cyclical high tide mark, and wetlands adjacent to all the above.

Water Table: The upper surface of groundwater. Below it, the soil is saturated with water.

Wetlands: Areas that are soaked or flooded by surface or groundwater frequently enough or long enough to support plants, birds, animals and aquatic life. Wetlands generally include swamps, marshes, bogs, estuaries, and other inland and coastal areas and are federally protected.

Wind Park: One or more wind turbines operating within a contiguous area for the purpose of generating electricity.

Worst Case Fresnel Zone Study: A study conducted to analyze a project's potential impacts to microwave paths in a given area.

Yaw: Side-to-side movement. For wind turbines, it refers to the angle between the axis of the rotor shaft and the wind direction. As this angle increases, the turbine's ability to capture the wind's energy decreases.

CHAPTER 10: PUBLIC COMMENT AND RESPONSE

10.1 INTRODUCTION AND COMMENT DOCUMENT INDEX

10.1.1 Process for Notification and Comment

Western Area Power Administration (Western) involved a range of agencies, Tribes, and public constituencies in review of the Grapevine Canyon Wind Draft Environmental Impact Statement (Draft EIS). To prepare, postcards were mailed or emailed to approximately 350 entities prior to the issuance of the Draft EIS to ask if and how they would like to receive the Draft EIS. Upon issuance of the Draft EIS, the U.S. Environmental Protection Agency published a Notice of Availability (NOA) for the Draft EIS in the Federal Register on July 23, 2010 (Vol. 74, No. 141, page 43161). The NOA also announced a 45-day comment period for receipt of comments. Locally, Western published a display ad and Coconino National Forest (Forest) published a legal notice in the Arizona Daily Sun with the NOA information, and announcements of two public hearings held on August 17 and 18, 2010, in Mormon Lake and Flagstaff, respectively. Western also provided notification of the issuance of the Draft EIS and the hearings to entities with email addresses. Compact discs and/or hard copies of the document were mailed to 108 agencies, Tribes, organizations, and individuals. Copies of the Draft EIS were also available at the Forest Supervisor's Office in Flagstaff, the Flagstaff and Winslow Public Libraries, and Western's Desert Southwest Regional Office in Phoenix, Arizona. The Draft EIS was also posted on Western and Forest websites.

10.1.2 Process for Tracking Comments and Responding

Western received 15 comment documents (letters, emails, comment card, and hearing testimony) as of September 7, 2011. It received three additional agency documents as of September 13, 2010 and included these in its review. All materials are listed in Table 10.1-1, the Comment Document Index (Index), below and reproduced in Section 10.3.

From the comment documents, Western identified and bracketed 126 substantive comments. Each comment was given a unique identifier consisting of a letter (describing the type of entity) and a sequential number. Each comment is listed in the Index at Table 10.1-1 below. Western organized the comments into three broad areas of interest and developed tables with the comments and agency responses:

- Table 10.2-1 Project Description
- Table 10.2-2 Resource Protection Measures (RPMs)
- Table 10.2-3 Resource Analysis

10.1.3 Finding Comments and Responses

Use the Index, Table 10.1-1 below, to locate the comment response table and sub-topic where the comments are located. Within each table, sub-topics are presented in roughly the same order as they appear within the EIS. Specific comments are reproduced (either verbatim or summarized) in the appropriate Table along with the agency's response. Some comments have been clustered because Western's response is pertinent to the group. If there seems to be no response to the right of a comment, look above it for the relevant global response. Many comments resulted in changes to the Draft EIS in terms of factual content or analysis. In these cases, the location of the revision is provided both in a separate column and within the body of the response. Various acronyms are used to help keep the tables brief and precise. Here is a list for reference:

ABPP	Avian and Bat Protection Plan
AGFD	Arizona Game and Fish Department
APLIC	Avian Power Line Interaction Committee
ASLD	Arizona State Land Department
ATC	Available Transmission Capacity
Balancing Authority	Western Area Lower Colorado Balancing Authority
BA	Biological Assessment
BFD	Bird Flight Diverters
BGEPA	Bald and Golden Eagle Protection Act
BMPs	Best Management Practices
CEQ	Council on Environmental Quality
CO	Carbon Oxide
CO_2	Carbon Dioxide
CREDA	Colorado River Energy Distribution Association
CRSP	Colorado River Storage Project
CWA	Clean Water Act
Draft EIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
Final EIS	Final Environmental Impact Statement
FSH	Forest Service Handbook
Forest Service	Coconino National Forest
GHG	Greenhouse gas
HPTP	Historic Properties Treatment Plan
Index	Comment Document Index
LGIP	Large Generator Interconnection Procedures

MET	Meteorological Tower
MBTA	Migratory Bird Treaty Act
mph	Miles per hour
MW	Megawatt
MWh	Megawatt hours
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NGO	Non-governmental Organization
NLCD	National Land Cover Database
NOA	Notice of Availability
NO_x	Nitrogen Oxide
NRHP	National Register of Historic Places
OASIS	Western's website
OATT	Open Access Transmission Service Tariff
PA	Programmatic Agreement
PM_{10}	10-micron particulate matter
ROD	Record of Decision
RPA	Rural Planning Area
RPM	Resource Protection Measure
SO_2	Sulfur Dioxide
SRP	Salt River Project
TES	Threatened and Endangered Species
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Services
Western	Western Area Power Administration
WECC	Western Electricity Coordinating Council
WTG	Wind turbine generator

TABLE 10.1-1
COMMENT DOCUMENT INDEX

Commenter	**Document Number**	**Comment Date**	*Table 10.2-1 Proposed Project*	*Table 10.2-2 Resource Protection Measures*	*Table 10.2-3 Resource Analysis*
Meteor Crater Enterprises Inc.	B-1	8/16/10			B-1.1 - Visual Resources
Mr. Ty Rock	C-1	8/18/10	C-1.1- Site Access C-1.2- Decommissioning		
Mr. Ty Rock	C-2	8/24/10	C-2.1- Site Access C-2.2- Site Access C-2.6- Post-Construction Restoration C-2.8- Decommissioning C-2.10 - Project Feasibility	C-2.3 - Minimizing Wildlife Impacts C-2.4 - Pre-construction Wildlife Surveys and Post-construction Monitoring Studies C-2.5 - Mortality Mitigation	
U.S. Bureau of Land Management, Phoenix District	F-1	8/15/10			F-1.1 - Biological Resources – Assessment of Impacts
U.S. Fish & Wildlife Service, Arizona Office	F-2	9/8/10		F-2.1 - Trench Work F-2.2 - Use of Guy Wires F-2.5 - Migratory Bird Protection F-2.6 - Scheduling Construction and Operation F-2.8 - Golden Eagle F-2.12 - Pre-construction Wildlife Surveys and Post-construction Monitoring Studies F-2.13 - Facility Design F-2.14 - Pre-construction Wildlife Surveys and Post-construction Monitoring Studies	F-2.3 - Biological Resources – Assessment of Impacts F-2.4 - Biological Resources – Raptors and Other Birds of Concern F-2.7 - Biological Resources – Assessment of Impacts F-2.10- Biological Resources – Assessment of Impacts F-2.11 - Biological Resources – Raptors and Other Birds of Concern F-2.27 - Biological Resources – Raptors and Other Birds of Concern
U.S. Department of Interior, Office of the Secretary	F-3	9/10/10			F-3.1 - Biological Resources – Bats F-3.2 - Biological Resources – Bats F-3.9 - Biological Resources –

TABLE 10.1-1
COMMENT DOCUMENT INDEX

Commenter	**Document Number**	**Comment Date**	*Table 10.2-1 Proposed Project*	*Table 10.2-2 Resource Protection Measures*	*Table 10.2-3 Resource Analysis*
					Raptors and Other Birds of Concern
U.S. Environmental Protection Agency, Region 9	F-4	9/13/10	F-4.1 - Project Description F-4.2 - Alternatives F-4.25 - Decommissioning	F-4.10 - Ground Disturbance F-4.11 - Golden Eagle F-4.13 - Golden Eagle F-4.14 - Pre-construction Wildlife Surveys and Post-construction Monitoring Studies F-4.15 - Pre-construction Wildlife Surveys and Post-construction Monitoring Studies F-4.16 - Threatened and Endangered Species F-4.18 - Migratory Bird Protection F-4.19 - Migratory Bird Protection	F-4.3 - Water Resources – Wetlands F-4.4 - Water Resources – waters of the U.S. F-4.5 - Water Resources – waters of the U.S. F-4.6 - Water Resources – waters of the U.S. F-4.7 - Water Resources – waters of the U.S. F-4.8 - Water Resources – waters of the U.S. F-4.9 - Water Resources – waters of the U.S. F-4.10 - Water Resources – waters of the U.S. F-4.12 - Biological Resources – Raptors and Other Birds of Concern F-4.17 - Biological Resources – Assessment of Impacts F-4.20 - Air Quality – Emissions Analysis F-4.21 - Air Quality – Emissions Mitigation F-4.22 - Air Quality – Climate Change F-4.23 - Cultural Resources – Gov't to Gov't Consultation F-4.24 Cumulative Effects-
Arizona Wildlife Federation	O-1	9/7/10		O-1.1 - Big Game	O-1.2 - Water Resources – Wetlands

TABLE 10.1-1
COMMENT DOCUMENT INDEX

Commenter	**Document Number**	**Comment Date**	*Table 10.2-1 Proposed Project*	*Table 10.2-2 Resource Protection Measures*	*Table 10.2-3 Resource Analysis*
Sierra Club, Grand Canyon Chapter	O-2	9/7/10		O-2.1 - Scope of Resource Protection Measures O-2.3 - Pre-construction Wildlife Surveys and Post-construction Monitoring Studies O-2.4 - Facility Design O-2.5 - Facility Design O-2.6 - Facility Design O-2.7 - Facility Design O-2.8 - Scheduling Construction and Operation O-2.9 - Scheduling Construction and Operation O-2.11 - Big Game O-2.12 - Scheduling Construction and Operation O-2.14 - Minimizing Wildlife Impacts O-2.17 - Revegetation O-2.18 - Scope of Resource Protection Measures	O-2.2 - Biological Resources – Assessment of Impacts O-2.15 - Biological Resources – Big Game O-2.16 - Biological Resources – Assessment of Impacts
Arizona Department of Environmental Quality	S-1	8/11/10			S-1.1 - Air Quality – Emissions Analysis S-1.2 - Air Quality – Emissions Mitigation S-1.3 - Air Quality – Emissions Mitigation
Arizona Game & Fish Department	S-2	9/1/10	S-2.6 - Project Description	S-2.2 - Pre-construction Wildlife Surveys and	S-2.1 - Biological Resources – Bats S-2.7 - Biological Resources –

TABLE 10.1-1
COMMENT DOCUMENT INDEX

Commenter	**Document Number**	**Comment Date**	*Table 10.2-1 Proposed Project*	*Table 10.2-2 Resource Protection Measures*	*Table 10.2-3 Resource Analysis*
			S-2.26 - Site Access	Post-construction Monitoring Studies S-2.3 - Pre-construction Wildlife Surveys and Post-construction Monitoring Studies S-2.4 - Minimizing Wildlife Impacts S-2.5 - Pre-construction Wildlife Surveys and Post-construction Monitoring Studies S-2.8 - Golden Eagle S-2.18 - Use of Guy Wires S-2.19 - Pre-construction Wildlife Surveys and Post-construction Monitoring Studies S-2.20 - Big Game S-2.21 - Facility Design S-2.22 - Scheduling Construction and Operation S-2.23 - Revegetation S-2.24 - Revegetation S-2.25 - Trench Work	Raptors and Other Birds of Concern S-2.9 - Cumulative Effects S-2.10 - Biological Resources – Big Game S-2.11 - Biological Resources – Raptors and Other Birds of Concern S-2.12 - Biological Resources – Bats S-2.13 - Biological Resources – Bats S-2.14 - Biological Resources – Bats S-2.15 - Biological Resources – Bats S-2.16 - Biological Resources – Bats S-2.17 - Biological Resources – Bats
White Mountain Apache Tribe Heritage Program	T-1	7/27/10			T-1.1 - Cultural Resources – Gov't to Gov't Consultation
Hopi Cultural Preservation Office	T-2	9/7/10	T-2.5 - Alternatives T-2.8 - Alternatives T-2.9 - Project Description	T-2.6 - Golden Eagle	T-2.1 - Cultural Resources – Analysis of Impacts T-2.2 - Cultural Resources – Gov't to Gov't Consultation T-2.3 - Cultural Resources –

TABLE 10.1-1
COMMENT DOCUMENT INDEX

Commenter	**Document Number**	**Comment Date**	*Table 10.2-1 Proposed Project*	*Table 10.2-2 Resource Protection Measures*	*Table 10.2-3 Resource Analysis*
					Analysis of Impacts T-2.4 - Cultural Resources – Analysis of Impacts T-2.5 - Cultural Resources – Analysis of Impacts T-2.7 - Biological Resources – Assessment of Impacts T-2.10 - Biological Resources – Assessment of Impacts
Navajo Nation	T-3	9/30/10			T-3.1 - Cultural Resources – Gov't to Gov't Consultation T-3.2 - Cultural Resources – Gov't to Gov't Consultation
Colorado River Energy Distributors Association	U-1	9/7/10	U-1.1 - Western's Actions U-1.2 - Western's Actions U-1.3 - Western's Actions		
Salt River Project	U-2	9/7/10	U-2.1 - Western's Actions U-2.2 - Western's Actions U-2.3 - Western's Actions		
Irrigation & Electrical Districts Association of Arizona	U-3	9/7/10	U-3.1 - Western's Actions U-3.2 - Western's Actions U-3.3 - Western's Actions U-3.4 - Western's Actions		
TOTALS			25	47	54

10.2 COMMENT RESPONSE TABLES

Western identified and bracketed 126 substantive comments. Each comment was given a unique identifier consisting of a letter (describing the type of entity) and a sequential number. Western organized the comments into three broad areas of interest and developed comment response tables:

- Table 10.2-1 Project Description
- Table 10.2-2 Resource Protection Measures (RPMs)
- Table 10.2-3 Resource Analysis

TABLE 10.2-1
COMMENT RESPONSES – PROPOSED PROJECT

Comment No.	Comment	Revisions at	Response
PROJECT DESCRIPTION			
F-4.1	The commenter recommends more detailed information on the proposed wind park including layout and design, so that environmental impacts may be more fully evaluated. The commenter recommends that, if the information is not available, publication of the Final EIS should be delayed or additional alternatives that encompass the full range of potential layouts, sizes, and numbers of wind turbine generators should be evaluated.	Figure 2.2-3 Table 2.2-4	Environmental impacts were fully evaluated based on a maximum disturbance estimate or maximum level of impact for the EIS. In response to comments received on the EIS, Foresight has provided a preliminary layout plan for the wind park that is described in detail in the Final EIS (Figure 2.2-3). For the environmental impacts analysis, resource specialists analyzed the range of potential impacts per resource for the up-to-500 MW wind park study area, which encompasses approximately 100,000 acres. The anticipated land disturbance and other impacts were addressed in the Draft EIS and are included in the Final EIS, based on the disturbance estimates in Table 2.2-4. The preliminary layout plan was designed to minimize and/or avoid impacts to resources including biological, cultural and Waters of U.S. As a result, additional sensitive resources have been identified in the wind park study area and additional efforts were made to minimize or avoid impacts. The preliminary layout plan reflects consultation with Federal and State agencies for biological and cultural resources, and potential Waters of U.S. Additional biological resource studies are being completed prior to final infrastructure micro-siting, in consultation with United States Fish and Wildlife Services (USFWS) and the AGFD. The studies would further inform efforts to avoid and minimize avian and bat impacts from the wind project. Similarly, additional pre-construction cultural resource surveys would be completed to avoid or minimize impacts to sensitive resources. The wind park study area encompasses almost 100,000 acres of private and State trust lands and substantially exceeds lands anticipated to be disturbed for the various wind park facilities. The anticipated land disturbance and other impacts are addressed in the Final EIS for the 500 MW project, with breakouts for many impacts for the up-to-250 MW phases. For example, if fully built out to 500 MW, construction is expected to temporarily disturb 2,050 to 2,193 acres and permanently disturb 555 to 570 acres of land. The large study area allows for micro-siting at the
S-2.6	The commenter requests additional description of project timeline and phasing and suggests it is not clear how concurrent construction of facility components described in the Draft EIS will be applied to Sites A, B, and C, or the exact extent of construction for phases 1 and 2. The commenter further requests additional discussion of the expected construction activities for the 250 megawatts (MW) versus the 500 MW build-out scenarios. The commenter recommends clarification of the project timeline to allow for two full years of data collection for all three study areas before construction in any study area begins.		
T-2.9	The commenter considers the Draft EIS to be too general given the proposed project is phased, and the proposed project area is oversized.		

TABLE 10.2-1
COMMENT RESPONSES – PROPOSED PROJECT

Comment No.	Comment	Revisions at	Response
			final construction design level so that facilities can be located to avoid resources and minimize impacts if feasible. The final project area, including the exact location of wind park facilities, would be determined during final project design for each construction phase. The preliminary layout plan incorporated in the Final EIS indicates the location of the initial and subsequent phases. The initial phase of construction would include the transmission tie-line, interconnection switchyard, step-up substation, operations and maintenance facility, primary site access road, service roads, and collector lines in addition to the wind turbines to provide the contracted energy. Subsequent phases would construct additional wind turbines, service roads, and collector and transmission lines. The discussion of construction activities in the Final EIS was revised in response to comments received to better indicate the phased nature of construction. Each phase would not exceed 250 MW; at full build-out the wind park would not exceed 500 MW. The size in MW of each phase would be determined by a power sale contract. The number and model of wind turbine generators (WTGs) are typically determined by the MW contracted in the power sale contracts as well as wind resource, turbine availability, and cost. As of the Final EIS, the project had not received a power purchase contract, thus the project construction timeline could not be provided. However, construction of the initial wind project phase is expected to require 12–18 months. As an example, if the two Federal agencies issued records of decision by the end of 2011, and Foresight acquired a power purchase contract, then construction could begin in late 2012.
ALTERNATIVES			
F-4.2	The commenter recommends that the alternatives analysis in the Final EIS be expanded to include either alternate site locations to the proposed wind park or on-site alternatives that demonstrate a reduction of impacts.	Section 2.6 Section 2.2	Western has noted the commenter's support for the No Action Alternative and this comment will be taken into account in Western's decision on whether or not to grant Foresight's interconnection request. Based on the commenter's recommendation to develop an additional alternative for the development of the proposed wind park, Western has revisited its alternatives analysis. Based on the comment, Western has updated the EIS in Section 2.6, Alternatives Considered but Eliminated. Regarding the project's proposed general location, as described in Section 2.2, wind energy is supported for additional economic development for ranchlands and working landscapes in the Diablo Canyon rural planning area (RPA). This local guidance
T-2.5	The commenter supports the No Action Alternative and recommends Western and the Forest Service develop an alternative that defines the project area as study area A and eliminates study areas B and C from further consideration.		

TABLE 10.2-1
COMMENT RESPONSES – PROPOSED PROJECT

Comment No.	Comment	Revisions at	Response
T-2.8	The Draft EIS has no alternatives other than the Proposed Alternative and alternative transmission lines, and is therefore inadequate pursuant to National Environmental Policy Act (NEPA).		was adopted by the Coconino County Board of Supervisors as an amendment to the Coconino County Comprehensive Plan in August 2005 (online at http://coconino.az.gov/comdev). This location was evaluated by Foresight for wind resource analysis, proximity to transmission, and ability to secure real property rights on contiguous lands suitable for wind energy generation. Regarding the consideration of on-site alternatives, resource specialists analyzed the range of potential impacts per resource for the up-to-500 MW study area and the preliminary layout plan was prepared to minimize and/or avoid impacts to resources. As a result, sensitive resources have been avoided in multiple areas within the wind project study area. The nature and location of many of these resources are not disclosed due to biological or cultural sensitivities. Regarding agency actions, Western and the Forest Service have re-examined the alternatives to their proposed Federal actions and believe that the EIS adequately supports the Federal decisions which need to be made in response to the proposed Grapevine Canyon Wind Project. Foresight has used the results of the EIS process to reduce or avoid the wind park's on-site impacts to the extent practicable.
PROJECT FEASIBILITY			
C-2.10	The commenter asks: *Does the wind park actually produce sufficient electrical energy to offset the building of components, construction of the wind park, and completion of all the legal requirements?*		Yes. All development, manufacturing and construction elements are factored into the power purchase pricing. The output of the wind park over its life would produce significantly more energy than would be required to build it.
WESTERN'S ACTIONS			
U-1.1	Has Western determined that the underlying transmission system has sufficient transmission capacity to accommodate the power flows from this project with no [impacts to] reliability, transfer capability, or contract rights of existing uses?	Section 2.1.1	The Interconnection Feasibility Study, Interconnection System Impact Study, and Interconnection Facility Study demonstrate that as modified, reliability and service on Western's transmission system will not be adversely affected by the interconnection. As explained in the EIS and in response U-3.2, the interconnection process and transmission service process are two separate and distinct processes within Western's OATT. Foresight has no current transmission service request pending with Western. Upon receipt of such a request, Western will conduct additional studies to ensure that system reliability meets all required North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) standards; transfer capability is within allowed and acceptable limits; and all customers (existing and future) with firm transmission service rights are treated on a comparable/equitable basis, as provided for in Western's OATT.

TABLE 10.2-1
COMMENT RESPONSES – PROPOSED PROJECT

Comment No.	Comment	Revisions at	Response
U-1.2	Have transmission and system studies been completed, and if so, what are the findings? Are there system upgrades or additional facilities necessary to accommodate the project?	Section 2.1.1	Western has completed the evaluation of Foresight's large generator interconnection (LGIP) request. The LGIP Facilities Study Report was provided to Foresight on March 24, 2010, and included a Good Faith Cost Estimate of $19,830,000 for Western to design and construct the substation facilities necessary to connect Foresigh's LGIP facility to Western's transmission lines.
U-1.3	The Socioeconomic portion of Table 1.4-1 incorporates, by reference, comments made by Colorado River Energy Distribution Association (CREDA) during scoping and refers to sections 2.7, 3.7, and 3.9. However, those subsequent sections do not specifically address the submitted comments.		Sections 2.7, 3.7 and 3.9 do properly speak to the socioeconomic impacts of Foresight's facilities in the EIS. They do not address the specific transmission service related questions raised by these comments since that is beyond the scope of this EIS. As for the operational concerns raised in the comments, when Western conducted the Interconnection Feasibility Study and System Impact Study, system conditions were modeled and it was determined that system reliability would not be detrimentally impacted. Further, Western has no plans for integrating the intermittent resource from Foresight's LGIP facility into the Western Area Lower Colorado Balancing Authority (Balancing Authority), and Foresigh has indicated that it has no interest in integrating this resource into the Balancing Authority.
U-2.3	The commenter notes that Chapter 1 claims that responses to previously submitted socioeconomic comments are provided in Sections 2.7., 3.7, and 3.9. However, none of the commenter's previously submitted comments [8/7/09] are addressed.		
U-2.1	According to Western's OASIS site, no firm long-term transmission rights are available on the Glen Canyon–Pinnacle Peak path in the southbound direction, and adequate northbound rights for the proposed full build-out of the project to 500 MW will not be available until 2019. The commenter believes that the EIS does not explain how Western would be able to support project objectives.		The availability or absence of long-term firm transmission rights posted on Western's OASIS site does not mean that potential customers cannot make requests for transmission service that may not appear to be available. When Foresigh submits a transmission service request to Western, it will be processed in accordance with Western’s OATT.
U-2.2	Given the limited number of parties subject to renewable energy standards that could take delivery from the project at Glen Canyon, and given the lack of transmission rights available to support delivery to Pinnacle Peak, the EIS does not explain how Foresight's stated objectives could be met.		In the event that facilities need to be constructed to satisfy a request for Firm Point-To-Point Transmission Service from Foresight's LGIP facility, and Foresigh is willing to pay to construct these facilities, Foresigh can obtain delivery rights to Pinnacle Peak. Otherwise, while the Colorado River Storage Project transmission system footprint basically ends at Pinnacle Peak, the transmission system footprint of the Balancing Authority extends on several transmission systems throughout Arizona and on to Nevada and southern California, allowing customers access to sell power to most utilities throughout the southwestern U.S.
U-3.1	Western proposes to modify its transmission system with the addition of the switchyard and the interconnection to the Glen Canyon–Pinnacle Peak lines based on the completion of three studies		In conducting the Interconnection Feasibility Study and the Interconnection System Impact Study, Western conducted power flow studies, stability studies and short circuit studies to analyze various combinations of system conditions. All of these studies are well recognized and are "standard" studies conducted within the utility

TABLE 10.2-1
COMMENT RESPONSES – PROPOSED PROJECT

Comment No.	Comment	Revisions at	Response
	[Interconnection Feasibility Study, Interconnection System Impact Study, and an Interconnection Facilities Study]. It asserts that there is no description of, analysis of, or cumulative analysis of any impacts to existing customers or to system reliability based on the studies. Discussion of system reliability and customer impacts should also be assessed in the analysis of irreversible and irretrievable commitments of resources because the project would be in place for at least 25 years. The commenter also notes that the studies mentioned are not listed in the references section.		industry for analyzing the impacts of interconnections to existing systems. None of the conducted studies indicated any type of detrimental impact to Western's ability to make delivery to existing customers or honor its contractual obligations to existing customers. In addition, none of the studies indicated any detrimental impact to Western's meeting its reliability standards or adhering to NERC/WECC Guidelines/Standards. There was no evidence of irreversible or irretrievable commitments of resources.
U-3.2	The Draft EIS takes a piecemeal approach to environmental analysis because: *Details, requirements, and environmental impacts for any other system improvements are unknown at this time, since they would be dictated by the on-going transmission service studies... [that] may identify additional upgrades needed to accommodate the transmission service needs.* The commenter asserts that the analysis of environmental impact under NEPA should fully address both the approval of interconnection and the granting of transmission service.		The interconnection process and transmission service process are two separate and distinct processes within Western's OATT. Any facilities that are required in order to effectuate the interconnection of Foresigh's generating facility to Western's transmission system are part of the "interconnection process". In this instance, there are no additional transmission facilities that are required in order to interconnect Foresight's generating facility to Western's transmission facilities – only new substation facilities are required. Had transmission system modifications or additions been required as part of the interconnection process, the NEPA process would have included these facilities. In the event that transmission system modifications/additions are required in order to meet a subsequent request for Firm Transmission Service from Foresight's generating facility, a separate NEPA process will be initiated and conducted for these facilities.
U-3.3	The Draft EIS states that: *If any needed transmission system modifications are identified after the completion of the EIS, Western and the Forest Service would address the environmental impacts of these modifications in accordance with regulatory requirements.* The EIS goes on to state that: *The transmission lines have capacity available to transmit additional electricity...*The commenter points out that the statement does not say how much or in which direction or whether the existing capacity can carry the generation contemplated by the proposed project.	Section 2.2	The EIS should not have included the statement: *the transmission lines have capacity available to transmit additional electricity*. The EIS should have indicated that the availability of transmission capacity can only be determined by observing Western's OASIS site. Corrections to the Final EIS have been incorporated into Section 2.2 per this comment.
U-3.4	Western must analyze the effects of providing transmission service to the proposed project because the project purposes cannot be accomplished without such	Section 2.1.1	Western's OATT includes processes for both interconnecting generating projects to Western's transmission system as well as for making a transmission service request to use Western's transmission system for making power deliveries. Both processes

TABLE 10.2-1
COMMENT RESPONSES – PROPOSED PROJECT

<table>
<tr><th>Comment No.</th><th>Comment</th><th>Revisions at</th><th>Response</th></tr>
<tr><td></td><td>transmission service. The effects may be direct, indirect, or reasonably foreseeable future effects. Western has no choice but to complete the transmission-related studies, analyze the environmental impacts, including socioeconomic impacts to existing contractors, and report them. Western may need to republish a Draft EIS if the impacts are significant.</td><td></td><td>are separate and distinct, with different steps, timelines, monetary deposits, etc. A request for interconnecting a generating facility does not require that a simultaneous request be made for transmission service, nor does a request for transmission service imply that a corresponding request for an interconnection must be made. While it is obvious in this situation that the generation from this project cannot get to any market without using Western's Colorado River Storage Project (CRSP) transmission system, there is nothing in Western's OATT that compels Foresight to make a transmission service request simultaneously with its request for interconnection. While the interconnection process includes a NEPA process, the transmission service request process for a new generation resource may or may not require a NEPA process. Section 2.1.1 of the Final EIS has been updated to provide this clarification.</td></tr>
<tr><td colspan="4">SITE ACCESS</td></tr>
<tr><td>C-1.1</td><td>The commenter understands closing the area for construction–for the safety issue, of course–but has difficulty with the operation phase of the project. The commenter asserts that the public was told at the public scoping meeting that it would have access to the entire project after the completion of the construction. The commenter would like clarification on that.</td><td rowspan="2"></td><td rowspan="2">Foresight would consult with the Forest Service, ASLD, private landowners and the County regarding public safety and access during construction phases. A newly constructed access road would provide access to private and State trust lands for which the ASLD anticipates issuing a non-exclusive right-of-way for the project, grazing lessees, and private landowners. Access to certain portions of the wind project would be restricted for public safety and project security; for example, the step-up substation and operations/maintenance facility. In addition, Western's interconnection switchyard, located on Forest Service-managed lands, would be restricted from public access. Following construction, it is expected that public use, including recreation and hunting, would generally continue as it has historically, subject to state law and potential private land limitations that are not associated with the wind park.</td></tr>
<tr><td>C-2.1</td><td>The commenter is concerned about controlling access because locked gates on private parcels may preclude entrance into public lands.</td></tr>
<tr><td>C-2.2</td><td>The commenter asks, who would monitor access to the wind park [during construction to avoid unauthorized public access] and how?</td><td></td><td>Foresight, through its prime construction contractor, would monitor access to the wind park construction area. This is typically done via a staffed sign-in station.</td></tr>
</table>

TABLE 10.2-1
COMMENT RESPONSES – PROPOSED PROJECT

Comment No.	Comment	Revisions at	Response
S-2.26	The commenter requests Foresight discuss any limitation on access to state and private lands with AGFD as access into these lands are crucial in meeting hunting objectives, especially for elk and pronghorn.	Table 2.7-1	Foresight consulted with AGFD regarding hunting access. Once the construction timeline and project area per phase are identified, Foresight would prepare a Hunter Education and Access Plan in coordination with AGFD. It is anticipated that this plan would include a public notice regarding construction activities and timeline, written notice to pronghorn and elk hunting permittees for Unit B, and a sign-in kiosk at public access points to the construction project. In addition, the Forest Service anticipates erecting a three-panel kiosk at the intersection of FR125 and Lake Mary Road that it would use to place information about construction or public access, especially as it would apply to construction of Western's proposed switchyard and the proposed transmission tie-line on Forest Service-managed lands. Generally, public use, including recreation and hunting, would continue as it has historically, subject to state law and potential private land limitations that are not associated with the wind park.
POST-CONSTRUCTION RESTORATION			
C-2.6	The commenter asks: *What entity will oversee post-construction reclamation? Will the public have input? What consequences will there be to the permittee for non-compliance?*	Table 2.7-1	The Forest Service right-of-way for the transmission line and switchyard would be managed under a special use permit with terms and conditions that are included in the Forest Service's decision of this EIS. If the terms/conditions of the special use permit are not met, then the Forest Service can issue a non-compliance notice. Based on the levity of the non-compliance situation and response (or lack of response), the Forest Service could revoke a special use permit for non-compliance. In situations where resource damage may be a result of a non-compliance with the permit terms and conditions, the Forest Service can address the situation and bill the special use permittee. The private landowner also has post-construction reclamation provisions in the land lease agreement with Foresight that would be implemented per the executed lease agreement per project phase.
DECOMMISSIONING			
C-1.2	The commenter remembers hearing at the public scoping meeting that there would be a decommission bond that would be required before any construction could be started on the project. The commenter stated that the EIS specifically indicates that that wasn't even addressed. The commenter would like clarification on that as well.	Section 2.2.1.5 Section 2.2.2.5	Decommissioning provisions are a typical term in land rights agreements, and are expected to be included in the required jurisdictional permits from the Forest Service (FS special use permit), Arizona State Land Department (ASLD right-of-way easement), and Coconino County (conditional use permit). Decommissioning provisions include stipulations for post-construction and non-compliance. For example, the Forest Service special use permit has standard language for removal of improvements that states, *"Prior to abandonment of the improvements or within a*

TABLE 10.2-1
COMMENT RESPONSES – PROPOSED PROJECT

Comment No.	Comment	Revisions at	Response
C-2.8	The EIS suggests that, if the project is decommissioned, the facilities may be removed and areas of disturbance may be reclaimed. The commenter is concerned with the understanding of the word may [emphasis original].		*reasonable time following revocation or termination of this authorization, the holder shall prepare, for approval by the authorized officer, an abandonment plan for the permit area. The abandonment plan shall address removal of improvements and restoration of the permit area and prescribed time frames for these actions. If the* (permit) *holder fails to remove the improvements or restore the site within the prescribed time period, they become the property of the United States and may be sold, destroyed or otherwise disposed of without any liability to the United States. However, the holder shall remain liable for all costs associated with their removal, including costs of sale and impoundment, cleanup, and restoration of the site."* On trust lands administered by ASLD, a standard provision of the right-of-way agreement for a wind energy generation facility requires the grantee to, "*Remove from the Subject Land all above-ground Windpower Facilities, equipment, and any other personal property of Grantee, all in a commercially reasonable manner that minimizes injury to the Subject Land; Reclaim and surrender the Subject Land in a condition at least as good as the condition in existence on the Commencement Date (subject to ordinary wear and tear and damage by fire or other casualty); Restore all Subject Land disturbed by Grantee, or any permitted sub-Grantee or assignee, to a condition and forage density reasonably similar to its original condition and forage density;* and *Complete, as reasonably required, all leveling, terracing, mulching and other reasonably necessary steps to prevent soil erosion, to ensure the establishment of suitable grasses and forbs, and to control noxious weeds and pests, in areas of the Subject Land that were disturbed by Grantee*." Further, "*If Grantee fails to remove from the Subject Land any of the Windpower Facilities, or any of Grantee's equipment or other personal property as required, then Grantor may remove the Windpower Facilities or any of Grantee's Personal Property and restore the Subject Land. Grantee shall reimburse Grantor for all reasonable costs of removal and restoration actually incurred by Grantor*." Foresight also has decommissioning and post-construction reclamation provisions in the land lease agreement with the private landowner that would be implemented per the executed lease per project phase.
F-4.25	The commenter recommends that the Final EIS identify bonding or financial assurance strategies for decommissioning and reclamation of the project site using a 25-year life span.		

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
SCOPE OF RESOURCE PROTECTION MEASURES			
O-2.1	While the Draft EIS proposes some limited mitigation and RPMs for the project, they are limited to the proposed switchyard and tie-line. We believe this scope is too narrow as the project is clearly dependent on utilizing the public's lands and the public's transmission lines. The impacts of the overall project should be considered and mitigation included.	Table 2.7-1	The commenter maintains that the RPMs that were provided in the Draft EIS were only for the transmission tie-line and switchyard. However, RPMs for the up-to-500 MW wind park and associated impacts were described in the Draft EIS. Table 2.7-1 includes RPMs for all elements of the project based on the NEPA requirement to evaluate and disclose the potential environmental impacts of all elements of a project regardless of land jurisdiction.
O-2.18	The commenter encourages a broader consideration of the overall impacts of this project due to the fact that the public lands and transmission system are integral components of it moving forward. Consideration of minimizing the impacts on the state and private lands and any mitigation should be included.	Section 2.6	While NEPA does not mandate agencies to mitigate adverse environmental impacts, the Council on Environmental Quality (CEQ) NEPA regulations at 40 CFR 1500.2(f) authorize agencies to use all practicable means, consistent with the requirements of the Act and other essential considerations of national policy, to restore and enhance the quality of human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment. In accordance with the CEQ NEPA regulations, mitigation includes minimizing impacts by limiting the degree or magnitude of the action and its implementation and by reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action (40 CFR Section 1508.20). These types of mitigation would avoid or reduce adverse impacts to wildlife and are consistent with the project's approach to mitigation. First, Foresight has designed and located the wind park facilities in a remote location in a manner that avoids and minimizes impacts. For the Final EIS, Foresight provided a preliminary layout plan that avoids or minimizes impacts of the wind park to biological, cultural, potential waters of the U.S., and other sensitive resources. For example, on Federal land, much of Foresight's tie-line route overlaps, or is adjacent to, already-disturbed lands. Also, Western's interconnection switchyard was located to avoid or minimize impacts to biological and visual resources. The primary access road was designed to minimize land disturbance. Additionally, Foresight committed to RPMs to reduce adverse project effects from the proposed wind park and transmission tie-line. Western and the Forest Service have committed to RPMs for the proposed switchyard and the transmission tie-line located on Forest Service-managed lands. Western and the Forest Service have addressed the potential impacts of all elements of the proposed project regardless of land jurisdiction.
GROUND DISTURBANCE			
F-4.10	The commenter recommends that ground disturbance be minimized in ephemeral washes to reduce impacts.	Section 3.6.2.2	Consistent with the comment, ground disturbance would be minimized in ephemeral washes and waters under Federal jurisdiction to reduce impacts. Where crossings are

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
	Potential damage that could result from the disturbance of flat-bottomed washes includes adequate capacity for flood control, energy dissipation, sediment movement, and high-value habitat for desert species.		constructed, culverts and low water crossings would be utilized to maintain the flow conditions to the downstream reaches. Energy dissipation treatments would be constructed where erosive conditions may exist as indicated by discharge resulting from storms up to and including the 100-year storm event. A narrative was added to the Final EIS (see Section 3.6.2.2) that describes a three-tiered approach to minimizing impacts consistent with Environmental Protection Agency (EPA) and United States Army Corps of Engineers (USACE) wetland regulations. The tiered approach uses: 1) avoidance as the primary mechanism to limit impacts to jurisdictional waters, and where feasible other water features; 2) configuration of development to minimize the quantity of jurisdictional waters and other water features impacted where avoidance cannot be achieved; and 3) engineering controls to further limit impacts where practicable.
REVEGETATION			
O-2.17	The commenter appreciates that the Draft EIS outlines the need to minimize soil disturbance and limit opportunities for the spread of invasive plant species. It strongly supports measures to revegetate with native endemic species and encourages consideration of these measures in all areas of the project.	Table 2.7-1 Section 3.2.2.2	As stated in the Draft EIS, Foresight would, *"use BMPs described in Forest Service Handbook (FSH) 2509.22 during construction and operation, including revegetating disturbed areas with native grasses and forbs."* These practices would apply to the proposed transmission tie-line on Forest Service lands. Foresight would also adhere to Best Management Practices (BMPs) for the proposed transmission tie-line that are expected to be reflected in the Forest Service's Special Use Permit, which may include BMPs for managing infestations as specified in *Treatment of Noxious or Invasive Weeds on the Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties, Arizona* (see Appendix C in the EIS). The wind park and transmission tie line located on ASLD lands would be in compliance with items pertinent to soils and invasive plant species in its right-of-way easement with the ASLD. Western would ensure that all construction vehicles and equipment for the construction of the switchyard would be sprayed before initial ingress onto National Forest Service lands. A high pressure hose would be used to clear the undercarriage, tire treads, grill, radiator, and beds of any mud, dire, and plant parts that may potentially spread the seeds of noxious plants. If revegetation is required by the Forest Service in its Special Use Permit issued for the switchyard, Western would use seed mixtures as recommended by the Forest Service.
S-2.23	AGFD requests that disturbed sites be monitored for multiple years to ensure that cheat grass (*bromus tectorum*) does not become established. In the event it does, annual-specific herbicides should be used to eliminate its occurrence.		
S-2.24	The commenter recommends Monsen et.al. 2004, *Restoring Western Ranges and Wildlands*, for seeding techniques and species assemblages to revegetate disturbed areas.		

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
TRENCH WORK			
F-2.1	The commenter supports project efforts to put the majority of power lines underground because it will reduce impacts to raptors. It recommends following trenching guidelines per AGFD. These include following existing disturbed areas; compacting soil in low areas at drainage crossings to reduce erosion; minimizing the amount of open trenches at any given time by working trenching and back-filling crews close together; trenching during the cooler months of October–March; avoiding leaving trenches open overnight; and where trenches cannot be back-filled, immediately, constructing escape ramps at least every 45 meters to AGFD specifications (many specifications, therefore not listed here).	Table 2.7-1	The commenter's support for underground power line installation is noted. The collection system between wind turbines and to the step-up substation would be underground where feasible. The 345-kV transmission tie-line would not be located underground; facilities of this nature are located above ground. RPMs were included in the Draft EIS to reduce impacts to raptors, and additional measures and refinements to the measures are included in the Final EIS. These measures include following guidance of the Avian Power Line Interaction Committee (APLIC) Suggested Practices for Avian Protection on Power Lines (2006) to minimize and mitigate risk of potential avian electrocutions along the proposed tie-line and any other overhead transmission lines associated with the wind park. To minimize collision risk, recommendations of the APLIC 1994 document *Mitigating Bird Collisions with Power Lines* have been incorporated. Regarding the recommended trenching guidelines, Foresight would endeavor to conduct trenching, cabling, and trench filling concurrently. Where site conditions allow, Foresight would utilize a rockwheel trencher which simultaneously cuts open the trench, installs the cable and closes the trench. Based on this construction method, it is expected that the majority of trenching would be back-filled on the same day, as recommended in the comment
S-2.25	The commenter recommends several standards be used for trench work. Trenches should be covered or back-filled as soon as possible and should always be covered overnight. Activities should be concentrated so that the area affected by digging or back-filling at any one time is as small as possible. Pits and trenches should be monitored often during and after construction. Incorporate escape ramps in ditches or fencing along the perimeter to deter small mammals and herpetofauna (snakes, lizards, etc.) from entering ditches. Escape ramps should be constructed at least every 90 meters. These can be short lateral trenches sloping to the surface at less than 45 degrees, or wooden planks extending to the surface.		
MINIMIZING WILDLIFE IMPACTS			
C-2.3	The commenter asks: *How does mitigation avoid adverse impacts to wildlife?*	Table 2.7-1	In accordance with the CEQ NEPA regulations, mitigation includes minimizing impacts by limiting the degree or magnitude of the action and its implementation and by reducing or eliminating the impact over time by preservation and maintenance

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
O-2.14	Because the potential impacts to wildlife are so significant, the commenter asks that AGFD's *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona* be utilized for ensuring wildlife-friendly alternatives and be considered as part of the Final EIS.		operations during the life of the action (40 CFR Section 1508.20). These types of mitigation would avoid or reduce adverse impacts to wildlife. Western, the Forest Service, and Foresight have prepared a preliminary layout plan to avoid and minimize impacts to wildlife to the extent possible for the proposed switchyard, wind park, and transmission tie-line. For unavoidable impacts, Foresight has committed to implement mitigation measures (also called RPMs in the EIS) which are intended to help offset projected impacts to wildlife. AGFD lists 10 practices that avoid or minimize impacts to wildlife in its *Guidelines to Reducing Impacts to Wildlife from Wind Energy Development projects in Arizona*. These measures are designed to avoid or minimize adverse impacts. The RPMs in Table 2.7-1 incorporate these practices, to the extent feasible or applicable to the project and were updated for the Final EIS. Foresight will continue to work closely with AGFD during the development and implementation of an Avian and Bat Protection Plan (ABPP). RPMs in the Final EIS (and included in the ABPP) would ensure that impacts to threatened, endangered, or sensitive wildlife species from project construction or operation are reduced or avoided to the extent feasible. A post-construction monitoring plan would be implemented to monitor project effects on wildlife and to help inform Foresight to adapt its operations in consultation with the USFWS and AGFD if project impacts prove to be greater than anticipated. The duration of post-construction monitoring will be addressed in the ABPP. Currently, two years of post-construction monitoring are planned.
MORTALITY MITIGATION			
C-2.5	The commenter asks: *"How is the mortality of any protected species of bird or raptor mitigated?"*	Table 2.7-1 Section 3.2.2.2	Foresight is voluntarily developing an ABPP in consultation with the USFWS and AFGD, which will provide for consultation during ABPP implementation and project operation. Post-construction mortality monitoring would be conducted to evaluate effects to bird species and populations and determine if any changes to the operational practices should be considered. The adaptive management component of the ABPP will include a toolbox of operational practices and/or compensatory measures; individual practices would be implemented as needed if post-construction monitoring demonstrates that impacts are greater than anticipated. Post-construction results would be used to inform adaptive management measures implemented for the initial phase and siting decisions in subsequent phases.

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
MIGRATORY BIRD PROTECTION			
F-2.5	The commenter states that the Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, except as permitted by regulations. The Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without identifying and implementing all reasonable, prudent, and effective measures to avoid that take. Companies are encouraged to work closely with the USFWS to identify available protective measures when developing project plans and/or avian protection plans and to implement those measures prior to or during construction.	Table 2.7-1 Section 3.2.2.2	The comment is noted and the RPMs in the Draft EIS include reference to the MBTA. In response to these comments, additional information on the impacts to migratory bird species was updated in the Final EIS (see Section 3.2.2.2). Foresight has worked closely with the USFWS and AGFD to develop RPMs for birds. Foresight is voluntarily developing an ABPP in consultation with the USFWS and AGFD. The ABPP will include operational practices to further minimize impacts to birds and bats. Pre-construction studies have been conducted and additional studies are being completed prior to final micro-siting of wind park elements to help inform any further avoidance and minimization to be reflected in final micro-siting. Post-construction studies would be conducted to monitor bird and bat fatality rates resulting from operation of the wind park. Post-construction results would be used to inform adaptive management measures implemented for the initial phase and siting decisions in subsequent phases. The adaptive management component of the ABPP will include a toolbox of operational practices and/or compensatory measures; individual practices would be implemented as needed if post-construction monitoring demonstrates that impacts are greater than anticipated.
F-4.18	The commenter recommends that Foresight work closely with USFWS in developing its ABPP and include a copy of the plan in the Final EIS.	Table 2.7-1 Section 3.2.2.2	Foresight has been working closely with the USFWS on the ABPP subsequent to this comment. The ABPP will include operational practices to further minimize impacts to birds and bats. Pre-construction studies have been conducted, and additional studies are being completed prior to final micro-siting of wind park elements to help inform implementation of the avoidance and minimization measures included in the ABPP. The Final EIS includes an update of any new avoidance and minimization measures (see Table 2.7-1). Post-construction monitoring would be conducted to monitor bird and bat fatality rates resulting from operation of the wind park. Post-construction results would be used to inform adaptive management measures implemented for the initial phase and micro-siting decisions in subsequent phases. An adaptive management plan will be included in the ABPP.
F-4.19	The commenter recommends Foresight adopt a formal Adaptive Management Plan to ensure the success of mitigation measures (to avoid the take of eagles for instance) and to provide flexibility to incorporate new information. The commenter further recommends that the agencies and Foresight review the discussion on Adaptive Management in the NEPA Task Force Report to the CEQ, *Modernizing NEPA*.		

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
GOLDEN EAGLE			
F-2.8	The commenter asserts that golden eagle (*aquila chrysaetos*) is a trust species missing from the Draft EIS that should be addressed more fully rather than left to discussion in the appendices. It is protected by the Bald and Golden Eagle Protection Act (BGEPA). It recommends that an additional year of pre-construction raptor surveys be conducted in order to better evaluate the risk to golden eagles from the project. The commenter observes that the status of breeding golden eagles in the Southwest and other western states is uncertain but many experts believe the species is declining. Two "inactive" golden eagle nests were found during surveys in the spring of 2008. The commenter maintains that nesting by golden eagles tends to be cyclic, and during some years breeding pairs may occupy territories but not lay eggs. Even though the pre-construction survey data suggests that avian mortality overall would be average compared to other facilities, the conclusion does not take into account the species-specific probability of mortality which is very high for golden eagles. The commenter states that placement of turbines within four miles of prairie dog towns should be avoided until additional surveys can be conducted.	Table 1.3-1 Table 2.7-1 Section 3.2.1.2 Section 3.2.2.2	The Final EIS has been updated regarding the golden eagle—refer to revised Sections 3.2.1.2 and 3.2.2.2. Additional surveys and evaluation for golden eagles are underway in consultation with USFWS. Spring nest surveys were conducted in 2011 within ten miles of all project components per the Draft USFWS Guidance (2011). Foresight has considered the final Federal Advisory Committee recommendations (April 2010) and AGFD's Guidelines (2009) and is working in consultation with USFWS in regard to recent Federal draft guidance for eagles. Foresight is currently working with USFWS to develop implementation level details for RPMs and advanced conservation practices for eagles, and an ABPP is being developed in consultation with USFWS and AGFD. Advanced conservation measures or practices may be developed to provide further implementation details. Impacts would be monitored through post-construction studies that assess fatality rates resulting from operation of the wind park using carcass searches and bias trials to produce seasonal and annual fatality estimates, use studies, and nest monitoring. An adaptive management protocol will be included in the ABPP so that, if mortality is greater than expected, wind park operations may be modified, and future phases can be designed and constructed to further minimize impacts or to provide compensatory mitigation. Surveys to document other important wildlife, such as prairie dogs, were undertaken within sub-study area A and throughout the wind park study area. The methodology for these surveys has been discussed with the AGFD and USFWS. Two years of pre-construction avian use surveys will be completed prior to construction of the initial phase as well as subsequent build-out phase(s) for the respective phase areas. Data from these studies will be used to inform final project micro-siting per phase to reduce and avoid impacts. The preliminary layout plan included in the Final EIS reflects placement of turbines to avoid prairie dog colonies. Regarding the comment on overall avian mortality, please see the response under the subsection on Migratory Bird Protection.
F-4.11	The commenter recommends identifying, in the Final EIS, specific measures to reduce impacts to eagles and comply with the MBTA and the BGEPA.		
S-2.8	The commenter recommends consultation with USFWS to determine appropriate measures to address bald and golden eagles under the BGEPA, including the development of advanced conservation practices. Advanced conservation practices should address prairie dog towns, nest sites, and other factors affecting golden eagle movement and survival. The Act requires specific authorizations and RPMs not addressed in the Draft EIS.		

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
	Status under the Act should be acknowledged for both bald and golden eagles throughout the document and standards established in the Act should be presented.		
T-2.6	There are Hopi eagle shrines adjacent to study area A and the two-mile buffer zone. The commenter continues to be concerned about their potential mortality from 500-foot tall wind turbines and asks how many eagle, raptor, and other bird mortality can be expected as a result of this project. The Draft EIS and project specifications should be revised to reflect new guidance in April, 2010 from USFWS, *Wind Turbine Guideline Advisory Committee Recommendations,* and AGFD's new *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona*.		
F-4.13	The commenter recommends that final decision documents commit the project to additional data collection and analysis to identify areas that are important to bald and golden eagles to avoid take and ensure proper siting.	Section 3.2	Subsequent to the comment being submitted, and in consultation with the commenter, additional surveys and evaluation for golden eagles within the wind park study area have been completed as reflected in the Final EIS. Foresight is consulting with the USFWS regarding additional data collection prior to final micro-siting to help inform avoidance and minimization to eagle impacts from the wind project. Western's Record of Decision (ROD) will address additional data and analysis collection needs for the proposed switchyard in relation to minimization of eagle impacts. The Forest Service's ROD will address data collection and analysis needs for the transmission tie-line and switchyard located on Forest Service-managed lands relative to minimizing eagle impacts.
THREATENED AND ENDANGERED SPECIES			
F-4.16	The commenter encourages Western and Foresight to relocate, reduce, or eliminate portions of the project footprint that would adversely affect Threatened and Endangered Species (TES) or their potential habitat. Actions that should be considered include minimizing placement of turbines near prairie dog towns, tactical shut-down during critical hours of species activity, blade feathering/idling, reducing cut-in speeds, adjusting turbine speeds, and using radar technology to monitor for birds and bats.	Section 3.2.2.2	A BA has been prepared as part of the consultation between Western, the Forest Service, and USFWS, concurrent with the EIS. The USFWS consultation is a separate process from the EIS review and addresses any project-related effects to listed species under the ESA. Western's correspondence related to consultation with the USFWS under the ESA will be included in Appendix A if it is published before the EIS is finalized. In response to these comments, additional information on the impacts to migratory bird species was updated in the Final EIS (see Section 3.2.2.2). The commenter's referenced actions have been considered and incorporated into the design and planned operations as appropriate and feasible. The ABPP will include operational practices to further minimize impacts to birds and bats. Pre-construction

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
			studies have been conducted and additional studies are being completed prior to final micro-siting of wind park elements to help inform avoidance and minimization measures adopted in the ABPP. Post-construction studies would be conducted to monitor bird and bat fatality rates resulting from operation of the wind park. Post-construction results would be used to inform adaptive management measures implemented for the initial phase and siting decisions in subsequent phases. An adaptive management component will be included in the ABPP. The Preliminary Layout Plan included in the Final EIS reflects placement of turbines to avoid prairie dog colonies. Relative to the other actions referenced in the comment, in consultation with the USFWS and AGFD, the ABPP will reflect a menu or toolbox of operational practices and compensatory mitigation and will address any impacts to TES species or their potential habitat.
USE OF GUY WIRES			
F-2.2	The commenter commends the project for avoiding the use of guy wires on Meteorological Tower (MET) towers. It recommends avoiding the construction of permanent met towers. If this is unavoidable, towers should be tubular or best available technology to reduce birds perching or colliding with the towers. Lights should be red or dual red-white and strobe-like or flashing, not steady burning lights, to meet Federal Aviation Administration (FAA) requirements. Only a portion of the turbines should be lighted. Lights should flash synchronously.	Table 2.7-1	Up to 16 permanent met towers the height of the WTG hub would be installed within the wind park study area for the project built out to 500 MW (see Section 2.2.1.3). Met towers at this height are necessary to collect weather information at approximately the WTG hub height. It is typically not possible to erect tubular un-guyed met towers of this height without extensive use of guy wire supports. Guy wires are believed to be a source of avian fatalities, particularly in poor weather conditions (see Manville 2009; Winkelman 1995); thus, Foresight prefers to avoid them where feasible. Therefore, lattice framed, un-guyed met towers would be used. Specific measures to reduce perching on lattice meteorological towers are not available at this time, but typical met lattice tower frameworks have limited areas suitable for perching raptors. Foresight is reviewing currently available, reasonable, deterrent measures to reduce bird perching on met towers. Carcass searches would be considered as part of post-construction monitoring being developed through the ongoing consultation with USFWS and AGFD to develop the ABPP. Per FAA regulations (see Section 2.2.1.3) all structures associated with the project 200 feet above ground level would be lit, including the permanent met towers. Flash duration and lighting intensity would be the lowest permissible under FAA regulations that is commercially reasonable. The lighting currently recommended by the FAA for installation on tall structures at commercial wind projects, such as wind turbines and permanent met towers, have not been shown to increase collision risk to birds and bats (Kerlinger et al. 2010; Arnett et al. 2008; Tidhar et al. 2010; Longcore et al. 2008; Manville 2009; Gehring et al. 2009). For commercial wind energy projects, the FAA currently recommends using strobe or strobe-like lights
S-2.18	The commenter requests that met towers be un-guyed and free-standing (not lattice type). Where guy wires are necessary, it asks that Bird Flight Diverters (BFDs) be used. For towers that are on-site for more than one year, the commenter further recommends that carcass searches be implemented, especially during the bird migration period. All met tower locations should be provided to AGFD for use in its aircraft safety efforts.		

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
			synchronously that produce momentary flashes interspersed with dark periods for up to three seconds in duration (FAA 2007). Red strobe or strobe-like lights are used and this lighting has not been demonstrated in several studies to increase collision related bird and bat fatalities (see Avery et al. 1976 in addition to references listed above). Pursuant to FAA regulations all structures associated with the proposed wind park 200 feet above ground level would be lit as directed by the FAA, including the permanent met towers. Flash duration and lighting intensity would be the lowest permissible under FAA regulations that is commercially reasonable
BIG GAME			
O-1.1	The EIS states that construction may *result in short-term changes in pronghorn movement or behavior if pronghorn occur in the project area during construction.* A timing restriction on construction within summer pronghorn habitat, particularly the transmission line, should be implemented during the fawning season from April 15 through May 31 to mitigate potential impacts to pronghorn during this critical period. The rationale for this condition includes: a) tie-line, switchyard, and the wind park study areas fall within the range of the Anderson Mesa pronghorn herd that declined in recent decades as the result of habitat degradation and drought; b) the primary management issue for the Anderson Mesa herd is low fawn recruitment; c) approximately 63 percent of the transmission line corridor is grassland habitat and pronghorn likely occur in these areas particularly during the summer breeding season; and d) the Forest Service uses annual road closures on Anderson Mesa to reduce impacts to pronghorn fawning.		Given the small acreage of grassland habitat impacted by the wind park transmission tie-line and switchyard, and the fact that this habitat type is abundant throughout the region, the Anderson Mesa pronghorn population trends and habitat viability would not be impacted by construction or operation of the tie-line and switchyard. Foresight is in consultation with AGFD regarding pronghorn, and would consult with AGFD regarding construction activities for the proposed wind park and transmission tie-line. Construction may result in short-term changes in pronghorn movement or behavior if pronghorn occur in the project area during construction. The area is not within a major migratory corridor. Project location, siting, and selection of RPMs are intended to avoid or minimize impacts on wildlife, including migratory animals. Given the wind park's planning efforts and RPMs, potential impacts are judged to be short-term and not adverse.
O-2.11	The commenter requests that wind facilities be constructed in a season when animals are not migrating in areas where these facilities intersect with critical ranges or migration corridors of large mammals.		

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
S-2.20	AGFD recommends that the project avoid construction during March 15 and May 31, if possible, since the project is located within pronghorn fawning habitat.		
PRE-CONSTRUCTION WILDLIFE SURVEYS AND POST-CONSTRUCTION MONITORING STUDIES			
C-2.4	The commenter asks: *"What is the purpose of post-construction monitoring of wildlife?"*	Table 2.7-1	A post-construction monitoring plan for the wind park study area is being developed to support the aims and objectives of the AGFD 2009 Guidelines and the FAC 2010 Recommendations. There are several objectives of the post-construction monitoring studies for the study area: 1) to monitor the level of bird and bat mortality attributable to collisions with wind turbines on an annual basis at the site in comparison to other wind-energy facilities; 2) to provide a general understanding of the factors associated with the timing, extent, species composition, distribution, and location of the fatalities found at the site; 3) to determine if a relationship exists at the site between bat activity and bat fatalities; 4) to determine if a relationship exists at the site between bird use and bird fatalities; 5) to monitor raptor nest activity at the site; 6) to provide information to inform development of subsequent phases of the wind park; and 7) to provide scientific data to inform the Adaptive Management Plan for the initial phase.
F-2.12	The commenter strongly recommends that additional work be completed to assess the risk of avian and bat impacts. In particular, the project should be considered a Category 3 site per AGFD's guidelines because of the number of proposed turbines and project size, presence of special status species such as golden eagles, and presence of prairie dog colonies that may concentrate raptor activity. The commenter points out, that as a Category 3 site, biological inventories for Sites B and C should be completed prior to construction in Site A. In addition, at least two years of pre-construction bird and bat data should be collected prior to construction at Site A with special attention to characterizing seasonal and spatial variability in species use. A post-construction monitoring plan to assess the impacts of operation on wildlife should cover at least three years of post-construction operations.	Table 2.7-1 Section 3.2.2.2	Consistent with the comments, additional studies have been completed since the Draft EIS publication and additional studies are ongoing. Foresight would complete a total of two years of pre-construction avian and bat surveys for the initial phase area prior to construction of that phase. Foresight would complete a minimum of one year of pre-construction surveys within other portions of the wind park study area prior to construction of the initial phase. Surveys for bald and golden eagle nests were completed within a 10-mile buffer of all project components during Spring 2011. In addition, Foresight would complete a second year of pre-construction surveys for subsequent phase areas prior to construction of those phases. This would result in the completion of two years of pre-construction data in all developed portions of the wind park study area. Two years of post-construction studies would be conducted to assess bird and bat fatality rates resulting from operation of the wind park; fatality monitoring uses carcass searches and bias trials to produce seasonal and annual fatality estimates. In addition, post-construction use monitoring would be conducted concurrently for bats (using acoustic monitoring) and birds (using point-count methodologies) to replicate pre-construction surveys. Information collected during post-construction studies completed for the initial phase would inform siting and

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
F-2.14	The commenter recommends that the project complete post-construction bird and bat fatality monitoring for at least two years. It also recommends that all bats collected during mortality searches be offered as a donation to the American Museum of Natural History for their ongoing North American Bat Samples for Genomic and Stable Isotope Studies.		adaptive management of subsequent phases as part of the ABPP being voluntarily developed in consultation with the USFWS and AGFD. Donation of bats collected during mortality searches to the American Museum of Natural History is being considered for inclusion in the ABPP and will be discussed further with the USFWS and AGFD. Post-construction monitoring duration will be addressed in the ABPP, currently under development in coordination with the USFWS and AGFD.
F-4.14	The commenter recommends conducting additional pre-construction surveys of raptors and bats prior to siting turbines, including study areas B and C not surveyed previously. It advises enlarging the area of survey for raptors and observes that some studies cover ten miles.		
F-4.15	The commenter recommends that the project commit to post-construction monitoring studies for at least two years, as described by the USFWS Wind Turbine Guidelines Advisory Committee.		
O-2.3	Research over the past two decades has pointed to a number of siting and operational options that can greatly reduce wildlife impacts based upon where turbines are sited and when they operate. One such action is to monitor before and during construction and operation to identify and minimize bird and bat mortality. The commenter cites research to suggest that frequent surveying of footprint areas for dead birds and bats is important as they may quickly disappear due to scavengers. Monitoring should include a baseline analysis of the nocturnal migration of songbirds as well as any detected bat migration.		

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
S-2.2	Prior to construction, at least two years of pre-construction bird and bat data be collected with special attention to characterizing seasonal and spatial variability in species' use. Pre-construction surveys for raptor use should be continued for at least one additional year (total of two years pre-construction per project area) as golden eagle nesting tends to be cyclic and during some years breeding pairs may not lay eggs in a territory. Other raptor species utilize more than one nest site between years, making multi-year surveys important for assessing impacts.		
S-2.3	Biological inventories should be completed for Sites B and C prior to construction in Site A.		
S-2.4	A post-construction monitoring plan should be designed to assess the impacts of operation on wildlife consistent with AGFD's Wind Guidelines, Table 4.		
S-2.5	Foresight's plan for one year of post-construction monitoring is inadequate.		
S-2.19	AGFD recommends acoustical monitoring of met towers across seasons with an emphasis on bat migration periods between August 16 and October 31 in order to assess met tower impacts on bats.	Section 3.2.1.2	Acoustic monitoring of bats was conducted in 2007–2008; additional acoustic monitoring is being conducted throughout the wind park study area (see Section 3.2.1.2). Specifically, acoustical monitoring at one met tower was conducted from June 26th to November 9th, 2007 and from April 12th to July 7th, 2008, capturing the migration period between August 16th and October 31st. Additional acoustic monitoring being conducted throughout the wind park study area includes additional acoustic monitoring at met towers. Few fatality monitoring studies have been conducted at met towers for bats in the U.S. To Foresight's knowledge, no records exist of bat fatalities resulting from collisions with guyed or un-guyed met towers. Avian and bat avoidance and minimization and baseline analysis monitoring would be addressed in the ABPP, currently under development in coordination with the USFWS and AGFD.
FACILITY DESIGN			
F-2.13	The commenter observes that the goal of monitoring studies is to inform the turbine arrangement and operating schedules for the wind projects. It states that negative impacts to raptor species can be minimized with tower configuration that uses clustering to	Table 2.7-1	Pre-construction studies have been conducted, and additional studies would be completed prior to final micro-siting to help inform avoidance and minimization to bird and bat impacts from the wind project. Turbine siting considerations include siting turbines at a minimum distance of 100 meters or more from canyon edges. The efficacy of using non-bladed pylons at string edges as a tool to reduce the likelihood

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
	minimize gaps and that incorporates non-bladed pylons at string edges. In addition, turbines sites on mesa rims should be placed at least 50 meters from the rim edge to minimize impacts to raptors.		of raptor collisions at comparably sized and comparably located wind projects has not been proven based on literature reviewed to date. Nonetheless this practice may be considered or provided as an option in the Adaptive Management Plan of the ABPP being developed in consultation with USFWS and AGFD. Additional mitigation measures for raptors are included in Table 2.7-1 and would be included within the ABPP and within the Adaptive Management Plan. Regarding raptor nesting and migration corridors, the project avoids active and known nests, and the biological evaluation area is not a migration corridor. WTGs would not be sited within 100 meters of the rims of Grapevine or Diablo canyons to minimize potential negative effects to birds.
S-2.21	The commenter emphasizes the importance of flexibility in arranging and operating turbines so that impacts on wildlife can be avoided, minimized, and/or mitigated. Tower configurations that cluster to minimize gaps and that incorporate non-bladed pylons at string edges would reduce negative impacts on wildlife.		
O-2.4	Research suggests that by avoiding raptor nesting and migration corridors, raptor fatalities can be minimized. Through wildlife surveys, scientists can also identify where raptors spend their time searching for prey, and these areas can then be avoided for turbine placement.		
O-2.5	The commenter also observes that research indicates it is valuable to avoid canyons, passes, and other migration pathways to minimize impacts. Valleys, swales, and low passes have been found to be used most by migrating birds and should be avoided.		
O-2.6	The commenter requests that setbacks from windward rims be required. Various studies have shown high use by raptors of rim edge habitats. Required setbacks of 100 meters for turbines can help reduce loss of raptors.		

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
O-2.7	The commenter requests that turbines be sited in open habitats at least one mile from woodland areas in order to reduce the likelihood of bat mortality. The main bat species known to be affected by wind turbines are woodland species. It is particularly important to completely avoid any old growth forest areas.		Direct impacts to *old growth* forestlands are not anticipated from development because there are no ponderosa pine stands in the wind park study area and less than 15 acres (representing less than 9.01 percent of estimated ponderosa pine vegetation type National Forest lands within the project area) of early seral stage ponderosa pine within the location of the tie-line. The Forest Land and RMP (1986, as amended) defines old growth forest based on the presence of large trees, presence of a number of large dead trees, adequate canopy cover within groups of trees, and presence of a number of large downed wood. All of these criteria need to be met to define a stand as old growth. The project area does not include any ponderosa pine vegetation that meets any of these criteria. Site visits of the project area documented that ponderosa pine which would be impacted include transition zone pine where small pine trees are encroaching within grassland habitat. Wind park components have been sited in the preliminary layout plan to reduce this impact. While the bat species most heavily impacted by wind-energy projects include woodland species such as hoary bat, silver-haired bat, and eastern red bat, those species are most heavily impacted during fall migration periods and available information is not conclusive as to whether bat mortality is associated with landcover or vegetation type. Please see Section 3.2.2.2 of the EIS for additional information.
SCHEDULING CONSTRUCTION AND OPERATION			
F-2.6	The commenter recognizes that the wind farm would operate 24 hours a day, 365 days per year. The commenter requests the project consider operational flexibility to allow particular turbines to be turned off during certain times to avoid negative impacts on wildlife, particularly migratory birds or bats. It further recommends that the operating schedule, its potential effects, and possible minimization measures be included in the ABPP currently under development.	Section 2.2 Table 2.7-1	The adaptive management plan of the ABPP, being developed in consultation with USFWS and AGFD, will include a toolbox of operational practices and/or compensatory measures; individual practices would be implemented as needed if post-construction monitoring demonstrates that impacts are greater than anticipated. This toolbox may include curtailment strategies such as cut-in speed adjustments to reduce bat fatalities. Pre-construction studies have been conducted and additional studies would be completed prior to final micro-siting to help inform avoidance and minimization to avian and bat impacts from the wind project. Pre-construction studies results would be used to inform final micro-siting decisions for the initial phase. Data collected during final design and post-construction from the initial phase would be used to help inform design and operations of later phases.
O-2.8	Research indicates that turbines should be shut down in late summer and early fall when bats are migrating and mortalities are highest.		
O-2.9	The commenter requests that a minimum "cut-in" speed of six meters per second be required to avoid bat mortalities at slow turbine speeds. There is a correlation between bat mortality and turbine operation during light wind speed.		

TABLE 10.2-2
COMMENT RESPONSES – RESOURCE PROTECTION MEASURES

Comment No.	Comment	Revisions at	Response
S-2.22	AGFD requests Foresight consider greater flexibility in its operating schedule than a 24/7 arrangement, to allow particular turbines to be turned off during certain times to avoid negative impacts on wildlife, particularly migratory birds or mammals. Curtailment strategies such as reducing cut-in speeds may reduce bat fatalities. Pre- and post-construction studies should be used in making determinations about turbine arrangement and operating schedules.		
O-2.12	The commenter recommends that turbine areas be closed to vehicles and human use during the period of habitation by sensitive species of wildlife.		The comment is noted. It is not possible to close the area to vehicles or human use as the wind park is located on working ranchlands with a checker-board private and State trust landownership pattern. However, the frequency of site visitation by wind park personnel during wind park operations is expected to be low, with most activity at the operations/maintenance building during the work week. The project was located to minimize impacts to sensitive species habitat by avoiding sensitive species' habitat types as much as possible. In addition, RPMs have been designed to avoid, minimize and mitigate project impacts to wildlife, and are included in the Final EIS. A post-construction study plan to monitor the effects of the project on wildlife and an Adaptive Management Protocol Plan are included in the ABPP being developed in coordination with the USFWS and AGFD.

TABLE 10.2-3
COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	Comment	Revisions at	Response
AIR QUALITY – EMISSIONS ANALYSIS			
F-4.20	The commenter states that the EIS should contain a more robust analysis of emissions from construction, vehicle use, equipment use, and on-site electricity generation.	Section 3.5.1.2	In response to comments received, an expanded, quantitative air emissions analysis was developed for the construction of the project. Earthmoving and tailpipe emissions from construction vehicles and equipment would produce air emissions for up to 18 months of the initial or subsequent construction phases. Fugitive emissions would result from land clearing; excavation for WTG and transmission tower foundations; roadway construction, and construction of the operations/maintenance building, step-up substations, and Western's switchyard. Vehicular activity required to erect and cable WTGs and transmission towers would also produce fugitive emissions. The on-site concrete batch plant and one or more borrow pits would function as point sources of air emissions. Overall, construction emissions would vary substantially from day to day, depending on the level of construction activity, the specific operations, and the prevailing meteorological conditions. Total emissions of 10-micron particulate matter (PM_{10}) are estimated at 38 tons for an 18-month construction phase. Total PM_{10} for the same period is estimated at 93 tons with Nitrogen Oxide (NO_x) estimated at nearly 51 tons and Carbon Oxide (CO) at nearly 22 tons. The Final EIS was updated in Section 3.5.1.2 to include the expanded, quantitative air emissions analysis.
S-1.1	The commenter states that the proposed project is located in an attainment area for PM_{10} and other air pollutants, and is likely to have a de minimis impact on air pollution.		

TABLE 10.2-3
COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	Comment	Revisions at	Response
AIR QUALITY – EMISSIONS MITIGATION			
S-1.2	The commenter recommends site preparation and construction measures to reduce disturbance of particulate matter, specifically to minimize land disturbance: suppress dust on traveled paths which are not paved through wetting, use of watering trucks, chemical dust suppressants, or other reasonable precautions to prevent dust entering ambient air; cover trucks when hauling soil; minimize soil track-out by washing or cleaning truck wheels before leaving construction site; stabilize the surface of soil piles; and create windbreaks.	Table 2.7-1 Section 3.5.2.2	The construction and operational phases of the proposed wind park would be subject to State of Arizona requirements to apply *reasonable control measures* to prevent dust emissions. The Draft EIS included RPMs to reduce the mass emissions of particles and visible emissions during construction of the wind park by restricting construction vehicular speeds on unpaved roadways to 25 miles per hour (mph) or less; applying gravel or other surface palliatives to unpaved areas and roadways; covering or otherwise shielding stock piles of soil or similar construction materials; and installation of vehicle track-out areas or wash-down areas to prevent fine dust from being tracked onto adjacent paved roads on Forest-managed lands. Additional RPMs for the proposed wind park added to the Final EIS would include frequent application of water or other surface palliative to active earthmoving areas and restriction of ground-disturbing construction activities during high wind events. Additional new RPMs for point-source emissions would include enclosing transfer points and water sprays or other palliative treatments to control emissions from material handling and loading activities; use of diesel engines that meet current EPA emissions performance standards (applicable to engines between 100-750 horsepower); and use of ultra-low sulfur diesel fuels for all equipment for which such fuel is technically feasible to substantially reduce tailpipe emissions of Sulfur Dioxide (SO_2) and PM_{10}. Western, in managing the construction of the proposed switchyard, would ensure its construction contractor abides by air quality provisions in it construction specifications.
S-1.3	The commenter recommends site restoration measures to reduce disturbance of particulate matter, specifically revegetate any disturbed land not used; remove unused material, and remove soil piles via covered trucks.		
F-4.21	The commenter recommends Foresight develop a Construction Emissions Mitigation Plan to incorporate all applicable requirements and additional measures to reduce emissions. Additional measures for fugitive dust source control, mobile and stationary source control and administrative control, as detailed in the comment document, should be incorporated in the final decision documents.		

TABLE 10.2-3
COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	Comment	Revisions at	Response
AIR QUALITY – CLIMATE CHANGE			
F-4.22	The commenter requests that the EIS assess how climate change could affect the proposed project and how project impacts could be exacerbated by climate change. It suggests quantifying and compiling the greenhouse gas emissions that would be produced by other types of electric generating facilities with comparable production, and comparing these values.	Section 3.5.1.2 Table 3.5-1	According to the 2009 report, *Global Climate Change Impacts in the United States*, climate-related changes have already been observed and are expected to grow. Rapid rates of warming are anticipated to lead to particularly large impacts on water resources and natural ecosystems. Water supplies are projected to become increasingly scarce while flooding events will become more frequent. Increasing temperature, drought, wildfire, and invasive species will accelerate the transformation of traditional landscapes. Climate change could exacerbate environmental impacts from the proposed project. Recent rapid warming trends in the southwest region would affect moisture content in vegetation, reducing forage for cattle and wildlife, and increase wildfire frequency and severity. These conditions would make revegetation of disturbed areas more difficult and impose an additional stress on wildlife. In terms of alleviating greenhouse gas (GHG) emissions, the proposed project could displace a small amount of Carbon Dioxide (CO_2) emissions, between 205 and 495 metric tons annually. Arizona's electric power industry generated just under 112 million megawatt hours (MWh) of electricity in 2009 that required 53.5 million metric tons of CO_2, the largest component of GHG emissions. As a whole, the industry required 0.48 metric ton of CO_2 per MWh of electricity. A breakout of 2009 industry emissions data by fuel source has been added to the EIS in Table 3.5-1.
BIOLOGICAL RESOURCES – ASSESSMENT OF IMPACTS			
F-1.1	While the proposed plan is adjacent to a small parcel of BLM land, it poses no resource concern.		Comment noted.
F-2.3	The commenter asserts that two species, Chiricahua leopard frog (*lithobates chiricahuensis*) and the narrow-headed garter snake (*thamnophis rufipunctatus*) have low potential to occur in the project area. The closest amphibian of concern to the project area is the northern leopard frog (*lithobates pipiens*) that occurs on Anderson Mesa.	Section 3.2.1.2	In response to this comment, the Final EIS has been modified in Section 3.2.1.2 to state that USFWS provided comment that these species are not likely to occur within the project area or be affected by the project.
F-2.7	The commenter recommends that discussion of Chiricahua leopard frog (*lithobates chiricahuensis*) and the narrow-headed garter snake (*thamnophis rufipunctatus*) be dropped.		

TABLE 10.2-3
COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	Comment	Revisions at	Response
F-2.10	The commenter noted that point count surveys were conducted during mid-day and therefore not representative of nocturnal species, passerines, or burrowing owls that forage early morning or late evening. It recommends that this information be included in the Final EIS and in the Avian Bat Protection Plan.		The point count surveys previously completed at study sub-area A were conducted during "daylight hours" (Appendix D-1), starting as early as 7:00 a.m. and ending as late as 5:36 p.m., therefore, passerines or other birds that forage early morning or evening were accounted for in the survey. Additional pre-construction bird use surveys would be completed throughout the wind park study area, including: 1) avian use surveys using a similar methodology to those completed during 2007-2008, 2) breeding bird surveys completed during the early morning period at representative habitats for songbirds, and 3) surveys completed to detect nocturnally active species and burrowing owls. A draft study plan describing these surveys has been discussed with the AGFD and USFWS. Prior to construction of the initial build-out phase of the wind park, a total of two years of pre-construction avian use surveys will have been completed within this study area. Data collected during these surveys would be incorporated into the final ABPP being prepared for the wind park, and considered when implementing the subsequent phases. These studies have been designed to further inform micro-siting decisions prior to construction.
F-3.1	The commenter observes that the public would benefit from a discussion of available scientific information regarding impacts of wind energy projects on bird and bat species. It suggests including an assessment of mitigation options that avoid or significantly reduce impacts on these species.	Section 3.2.2.2	In response to this comment, additional information from publically available scientific studies and reports on the impacts of wind energy projects on birds and bats have been included in the Final EIS in Section 3.2.2.2. Avoidance, minimization, and mitigation measures designed to avoid or reduce impacts to birds and bats were included in the Draft EIS as RPMs, and additional measures have been added to the Final EIS. Numerous references and literature citations have been provided which describe in further detail important components of these topics.
F-4.17	The commenter recommends Western include the BA and the outcome of its consultation with USFWS in the Final EIS.		Western has completed a BA for the proposed project. The results of the USFWS consultations are summarized in the Final EIS. Western submitted the BA to the USFWS on February 9, 2012 with the determination that the proposed project may affect, but is not likely to adversely affect, the Mexican spotted owl. The USFWS concurred with this determination in a concurrence letter dated March 12, 2012.
O-2.2	Thorough surveys of birds, mammals, plants and other wildlife are an essential first step in avoiding and minimizing impacts. This includes surveys in all seasons to capture migration periods and fluctuations in population depending on the season. Surveys should be done at night as well as during daylight as migration, particularly of birds, often happens at night. Since less is known about affected species such as bats, monitoring is very important to determine the baseline presence of bat species.	Table 2.7-1 Section 3.2.2.2	Pre-construction wildlife and plant surveys have been conducted, and additional studies are currently underway or are planned prior to construction of the initial phase of the wind park. Avian surveys were conducted in all seasons for sub-study area A. Additional pre-construction bird use surveys will be completed throughout the wind park study areas, including: 1) avian use surveys using a similar methodology to those completed during 2007-2008, 2) breeding bird surveys completed during the early morning period at representative habitats for songbirds, and 3) surveys completed to detect nocturnally active species and burrowing owls. Bat acoustic surveys were completed in sub-study area A. Additional bat surveys including acoustic monitoring and mist-net surveys will be conducted throughout the wind park study area. Surveys to document other important wildlife such as prairie

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COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	Comment	Revisions at	Response
			dogs were undertaken within sub-study area A and throughout the wind park study area. The methodology for these surveys has been discussed with the AGFD and USFWS. Prior to construction of the initial phase of the wind park, a total of two years of pre-construction avian use surveys will have been completed for the initial phase area. Similar surveys will have been conducted for subsequent phase areas prior to construction. Data collected during these surveys will be incorporated into the final ABPP being prepared for the wind park.
O-2.16	Scientific studies indicate that roads and motorized uses have serious detrimental effects on habitats and wildlife. These effects include direct, indirect, and cumulative impacts, ranging from mortality from collisions with vehicles, modification of animal behaviors, altered use of habitats, facilitation of the spread of exotic, invasive and parasitic species, adverse genetic effects and fragmentation of connected habitats. These impacts are not limited to paved route networks. Cole states that: *off-road vehicle impacts are particularly serious and difficult to manage.*		Consistent with Foresight's approach to minimizing impacts, the footprint of the site access and service roads were reduced to the extent possible. Table 2.7-1 lists RPMs that Foresight has committed to. For example, during construction, Foresight has committed to implementing a 25 mph speed limit along the right-of-way and access roads to minimize the risk of wildlife collision. Foresight does not anticipate off-road vehicle use during construction or operations. BMPs for exotic and invasive species are included in the RPMs in the Final EIS.
S-2.1	The commenter considers the project to be a Category 3 project under its Wind Guidelines, that is, it has high or uncertain potential for wildlife impacts involving birds and/or bats, special status species, or other species. Indicator project characteristics include number of proposed turbines and project size, special status species occurring on or adjacent to the site, and the presence of current or historic prairie dog colonies that may concentrate raptor activity.	Table 2.7-1 Section 3.2.2.2	The comment is noted. Foresight has been in communications with AGFD since 2007 regarding the presence of sensitive species and critical habitat, and the conduct of avian and bat studies. Foresight has consulted with AGFD and USFWS outside of the EIS process to develop wildlife study plans and draft RPMs to avoid, minimize and mitigate impacts to wildlife. Foresight is voluntarily developing an ABPP in consultation with the USFWS and AGFD. See Section 3.2.2.2 in the Final EIS for information on potential levels of impact on wildlife and habitat.
T-2.7	The commenter determined that this proposal will cause significant adverse effects to biological resources significant to the Hopi Tribe. The commenter stated it does not support a crossing of Diablo Canyon, or any disturbance within the Canyon or on the east side of the Canyon.	Section 2.6 Section 3.3.2.2	Western has noted the commenter's support for the No Action Alternative and this comment will be taken into account in Western's decision on whether or not to grant Foresight's interconnection request. Based on the commenter's recommendation to develop an additional alternative for the development of the proposed wind park, Western has revisited its alternatives analysis. Based on the comment, Western has updated the EIS in Section 2.6, Alternatives Considered but Eliminated. Regarding the comments on adverse effects to historic properties, Western's determinations of effect on properties determined to be eligible to the National Register of Historic Places (NRHP) will be made in accordance with stipulations in the Programmatic Agreement (PA) regarding the construction of the proposed Grapevine Canyon Wind

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			Project. This PA was executed on September 3, 2010. Western's and the Forest Service's goal is to achieve a *no adverse effect* by avoiding National Register-eligible cultural resources to the extent feasible and practical. The PA specifically includes a stipulation that should historic properties be identified during additional Class III inventory, Western, in consultation with Foresight and consulting parties to the PA, would attempt to move the impacting activity, modify the activity to reduce or eliminate adverse effects, or if possible cancel the activity. Should none of these options be possible, Western would prepare a treatment plan following the guidance provided in the Historic Property Treatment Plan per stipulations in the PA. Regarding the comments on effects to biological resources, raptor nest surveys were conducted within a ten-mile buffer of all project components, including in the vicinity of the proposed access road crossing of Diablo Canyon. Sensitive species' habitat was also assessed along the primary access route. No nests or habitat were found. Consistent with Foresight's approach to minimizing impacts, the footprint of the crossing route was reduced to the extent possible. Additional pre-construction clearance surveys are being conducted or are planned for sensitive biological resources, in consultation with USFWS and AGFD. Information collected during post-construction studies for the initial phase will help inform siting of subsequent phases, and will be reported as part of the ABPP being voluntarily developed for the wind park in consultation with the USFWS and AGFD. Based on these findings and consultations, Foresight would implement an adaptive management plan within the ABPP if the project impact on birds and bats is greater than expected.
T-2.10	Based on potential adverse effect to cultural and biological resources, and the lack of alternatives, we support the No Action Alternative and recommend Western and Forest develop an alternative that defines the project area as study area A and eliminates study areas B and C from further consideration.		
BIOLOGICAL RESOURCES – BATS			
F-3.2	The commenter states that bats of certain species are dying at wind turbines in unprecedented numbers, and causes of bat fatalities at turbines remain unclear. It recommends that the Final EIS include scientific information from studies by Cyran and others that synthesize the hypothesized causes of bat fatalities at wind turbines, examine mating behavior as causal, and identify certain species of bats as highly susceptible to	Section 3.2.2.2	In response to this comment, additional information from publically available scientific studies and reports on the impacts of wind energy projects on birds and bats have been included in the Final EIS in Section 3.2.2.2. Avoidance, minimization, and mitigation measures designed to avoid or reduce impacts to birds and bats were included in the Draft EIS as Resource Protection Measures, and additional measures have been added to the Final EIS. Numerous references and literature citations have been provided which describe in further detail important components of these topics (see Section 3.2).

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COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	Comment	Revisions at	Response
	mortality at wind turbines.		
S-2.12	The commenter observes that AGFD recognizes 28 species of bats in Arizona, not 30. AGFD is a more appropriate source for information about Arizona's bat populations than non-governmental organization (NGO) sources.	Section 3.2.1.2	The text of the Final EIS has been updated in Section 3.2.1.2 to read: *Based on information from the AGFD, and range maps and species accounts from Bat Conservation International (2009), 28 to 30 species of bat are known to occur in Arizona*.
S-2.13	The commenter states that, *"Although "no known bat hibernaculum or roosts of importance have been noted within the vicinity of the wind park study area," it is important to note that approximately half of AZ's 28 species hibernate, and that there are approximately 10 or fewer known hibernacula for all hibernating bat species in AZ; therefore, saying "no known bat hibernacula" is certainly not an indication that there's an absence of those type of roosts (p. 104)."*	Section 3.2.2.2	In response to the comment, text has been updated in the EIS (see Section 3.2.2.2). No known bat hibernacula or roosts of importance have been noted within the vicinity of the wind park study area by the AGFD or the USFWS, however, formal surveys have not been completed in this area by Foresight or the AGFD to search for bat hibernacula or roosts. Arizona contains few documented hibernacula (ten) and the wind park is not situated in an area which would be likely to contain large hibernacula relative to the surrounding region. Features with the highest probability of containing bat roosts or hibernacula (rocky features with caves or crevices such as canyon walls, or large snags or loose bark trees) would be avoided by the project.
S-2.14	The commenter requests the EIS define *extraordinary fatality rate* and recommends the rate be defined as two or more bats per turbine per year.		The comment is noted. Foresight defines an extraordinary fatality rate as an observed fatality rate significantly higher (statistically) than the regional average, as determined through formal post-construction monitoring studies that incorporate carcass searches and bias trials in order to estimate bat fatalities. These post-construction studies would be completed at Grapevine so that operations can be evaluated and modified to the extent feasible. Subsequent to receiving this comment, Foresight consulted with USFWS and AGFD and received support for developing an adaptive management protocol as a component of an ABPP. The results of post-construction monitoring studies, including comparable studies, where applicable, would be discussed with the AGFD and USFWS.
S-2.15	The commenter disagrees that the potential for occurrence of the big free-tailed bat (*nyctinomops macrotis*) is *moderate*. It recommends the potential for occurrence is *high* within the project area because this species can fly great distances between roosting and foraging areas.		In response to this comment, the high potential for occurrence of big free-tailed bat in the project study area is noted as recommended by the commenter. The comment references text in the Draft EIS Volume II, Appendix D. 1 p. 53; please note that Appendix D.1 was not revised for the Final EIS. The Draft EIS text, Section 3.2.1.2, subheading "Bats," stated that the species was one with the potential to roost or forage on the site, therefore, the potential for occurrence consistent with the comment was reflected in the Draft EIS text.
S-2.16	The commenter recommends that the potential for occurrence of Allen's big-eared bat is high, not low as indicated in the Draft EIS, because this bat can easily travel 20 miles one way in a night between forage and roosting areas.	Table 3.2-1	The high potential for occurrence of Allen's big-eared bat, also known as Allen's lappet-browed bat, in the project study area is noted as recommended by the commenter. The Final EIS, Table 3.2-1, was modified to address this comment (using the name Allen's lappet-browed bat).

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Comment No.	Comment	Revisions at	Response
S-2.17	The commenter disagrees that the project will not affect breeding habitat or important potential hibernacula for the Allen's lappet-browed bat. This species may pass through the transmission line area in transit between foraging areas in the surrounding region. AGFD has no records for hibernacula used by this species, therefore it is impossible to evaluate many issues associated with effects to it. The commenter recommends that the potential for occurrence of Allen's lappet-browed bat is high, not low as indicated in the Draft EIS, because this bat can fly long distances between forage and roosting areas.	Section 3.2.2.2	In response to this comment, the high potential for occurrence of Allen's lappet-browed bat in the project area is noted as recommended by the commenter. The Final EIS has been modified in Section 3. 2.2.2 to include the conclusion that this species may pass through the transmission line area in transit between foraging areas in the surrounding region.
BIOLOGICAL RESOURCES – RAPTORS AND OTHER BIRDS OF CONCERN			
F-2.11	The commenter asserts that raptors other than golden eagles are a trust species missing from Draft EIS that should be addressed more fully rather than left to discussion in the appendices. Relatively high raptor abundance was documented during avian use surveys completed in sub-study area A between 2007–2008 at survey locations located near prairie dog towns within the proposed project area. Based on the analysis, the commenter estimates that up to about 50 raptors could be killed annually at 500 MW build-out, with an estimated range of 0-175 raptors (90 percent CI). The greatest raptor abundance occurred at three plots that were within or adjacent to prairie dog towns. Raptors, especially golden eagles and red-tailed hawks, will be vulnerable to collision with any turbines placed in these areas. The commenter requests this issue be addressed in the ABPP.	Table 2.7-1 Section 3.2.1.2 Section 3.2.2.2	In response to this comment, text has been updated in Final EIS regarding raptors, including golden eagles; refer to revised Sections 3.2.1.2 and 3.2.2.2. RPMs have been developed to avoid, minimize and mitigate impacts to raptors (see Table 2.7-1). Foresight is voluntarily developing an ABPP for the project in consultation with the USFWS and AGFD. Impacts to raptors are included within the ABPP. Foresight has designed the initial phase to directly avoid prairie dog towns and raptor nest sites, based on the results of spring 2011 field surveys. Discussion about this potential impact was also added to the Final EIS in Section 3. 2.1.2. Similar effort would be conducted for future phases.
F-4.12	The commenter recommends a discussion in the Final EIS of the applicability of the recently finalized USFWS permit regulations under the Bald and Golden Eagle Protection Act for take of eagles on a limited basis, provided that the take is compatible with preservation of the species and cannot be practicably avoided.	Section 1.3.2.3	Additional text has been added to the Final EIS regarding the BGEPA (see Section 1.3.2.3). Foresight is working in consultation with USFWS to address recent Federal draft guidance for eagles. Additional surveys and evaluation for golden eagles are being conducted, in consultation with USFWS.

TABLE 10.2-3
COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	**Comment**	**Revisions at**	**Response**
S-2.7	Golden eagles should be considered a special status species per AGFD's State Wildlife Action Plan and the Bald and Golden Eagle Protection Act. The Draft EIS underestimates the potential for negative impacts on golden eagles.	Section 3.2.1.2 Section 3.2.2.2	In response to this comment, text has been updated in the Final EIS regarding golden eagle; refer to revised Sections 3.2.1.2 and 3.2.2.2.
S-2.11	The commenter's own surveys located active prairie dog colonies in study area C as well as study area A that is referenced in the Draft EIS. The Draft EIS states that the risk of raptor mortality would be lower in study areas B and C based on the assessment that prairie dog numbers are lower in these locations. This assertion is made without the benefit of inventory for either area B or C. The presence of prairie dogs in area C, in addition to the topographic features within study area B, indicate that the risk of raptor mortality may be similar or even greater in study areas B and C than it is in study area A.	Section 3.2.1.2	Additional prairie dog town mapping has been completed throughout the wind park study area since this comment was received. The EIS has been updated to include this information in Section 3.2.1.2. Additional avian surveys are underway such that two years of pre-construction survey work will be completed for the initial phase and subsequent phases to characterize species use. Studies will include prairie dog town mapping.
F-2.4	The commenter recommends correcting the EIS to state that USFWS authorizations include the MBTA and the BGEPA in addition to the Endangered Species Act (ESA).	Table 1.3-1	In response to this comment, the EIS has been modified to address this comment, including an update to Table 1.3-1.

TABLE 10.2-3
COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	Comment	Revisions at	Response
F-2.27	The Draft EIS does not specifically discuss Birds of Conservation Concern, which are demonstrating population declines and may be considered for candidate status under the ESA in the future. The project area lies at the edge of Bird Conservation Regions 16 and 34. Specifically, the piñon jay may be at relatively high risk of collision with project infrastructure. Foresight may want to specifically address how to minimize impacts to this species in the ABPP.		In response to this comment, text regarding USFWS Birds of Conservation Concern has been updated in the Final EIS in Section 3.2.1.2 to address this comment. Although a total of 196 observations of piñon jay were made during avian use surveys completed between 2007–2008 at Sub-study area A, only 11.2 percent of these observations were of birds flying within the proposed wind turbine generator rotor swept area, characterized in the report as the Zone of Risk. West Inc. maintains a proprietary database of post-construction monitoring studies and performed a query on August 11, 2011. This review found 74 public reports of post-construction fatality monitoring studies of operating wind projects in North America of which zero piñon jays were reported as wind turbine casualties. These results do not suggest that the species may be especially prone to wind-turbine collision. Nonetheless, additional surveys are underway which will provide further information on the relationship between site characteristics, bird use and abundance, and the project. Post-construction surveys would be completed at the project which would provide information on the fatality rate of piñon jays observed at the wind park study area. Foresight is voluntarily developing an ABPP in consultation with the USFWS and AFGD, which will provide for consultation during ABPP implementation and project operation. Information collected during additional surveys will be incorporated into the plan and additional mitigation measures may be developed

TABLE 10.2-3
COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	Comment	Revisions at	Response
F-3.9	The commenter asserts that USFWS Birds of Conservation Concern is a trust species missing from Draft EIS that should be addressed more fully rather than left to discussion in the appendices. These species are demonstrating population declines and may be considered for candidate status under the ESA. Abundance of birds, particularly passerines, was substantial at point count plot nine, averaging 36 birds per 20 minutes of survey. The commenter recommends that vegetation, topography, and other site characteristics be scrutinized to determine why avian abundance is higher at this site and possibly sites with similar characteristics that were not surveyed. Wind turbine generator siting should be avoided until additional surveys indicate whether high levels of bird mortality are likely. The commenter suggests that the ABPP review these data as well as displacement impacts to birds, and propose construction and site management practices to reduce these effects.		based on the results of these surveys as part of the adaptive management protocol.
BIOLOGICAL RESOURCES – BIG GAME			
O-2.15	The commenter is particularly concerned about the impact of this project on the pronghorn on Anderson Mesa, *"There has been considerable controversy to date regarding the decline of this herd and the impacts of livestock grazing. The numbers have significantly dwindled. Pronghorn are especially sensitive to roads and fences. This project includes construction of a transmission line through Anderson Mesa and the heart of some pronghorn habitat. The construction…entails building a road under the lines."*		The comment is noted, and Foresight is in consultation with AGFD regarding pronghorn. Project planning would take into consideration minimization efforts to reduce impacts to wildlife. The Draft EIS concluded that effects would be minor because the proposed project is not in a major migratory route. Construction may result in short-term changes in pronghorn movement or behavior if pronghorn occur in the project area during construction, as discussed at response O-1.1 in Table 10.2-2 (RPMs, *Big Game*). Regarding project operation, location, and siting, RPMs are intended to avoid or minimize impacts on wildlife, including migratory large mammals. Operation of the tie-line and switchyard would also not be expected to have an effect on pronghorn populations. Given the small acreage of grassland habitat impacted by these two facilities, and the fact that this habitat type is abundant throughout the region, the Anderson Mesa pronghorn population trends and habitat viability would not be impacted by construction or operation of the tie-line and switchyard.

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Comment No.	Comment	Revisions at	Response
S-2.10	The commenter states that the Draft EIS underestimates the uncertainty regarding potential negative impacts the project may have on big game and their habitats. AGFD recommends Foresight support further research designed to better understand the impacts of wind project construction and operation on big game including pronghorn. It requests the opportunity to discuss funding for its research proposal. AGFD is aware of only one study, conducted by West, Inc. in Wyoming where pronghorn populations are generally larger, that indicates some big game resilience to wind development. AGFD data demonstrate that individual animals move through all three study areas but do not assess the degree to which pronghorn utilize the area or measure the potential impacts of development on their movement, behavior, or reproductive success.		Western has revisited its analysis on big game and their habitats and believes that the Final EIS appropriately addresses effects to big game. The Draft EIS concluded that effects would be minor because the proposed project is not in a major migratory route. Construction may result in short-term changes in pronghorn movement or behavior if pronghorn occur in the project area during construction, as discussed at response O-1.1 in Table 10.2-2 (RPMs, *Big Game*). Regarding project operation, location, and siting, RPMs are intended to avoid or minimize impacts on wildlife, including migratory large mammals. Operation of the tie-line and switchyard would also not be expected to have an effect on pronghorn populations. Given the small acreage of grassland habitat impacted by these two facilities, and the fact that this habitat type is abundant throughout the region, the Anderson Mesa pronghorn population trends and habitat viability would not be impacted by construction or operation of the tie-line and switchyard. The commenter's request for funding is outside the scope of the EIS process, but the commenter's reference of prior studies addressing effects to big game is appreciated.
CULTURAL RESOURCES – GOVERNMENT TO GOVERNMENT CONSULTATION			
F-4.23	Include a copy of the PA in the Final EIS, and describe the process and outcome of government-to-government consultation between Western and each of the Tribal governments within the project area. Specifically, issues that were raised and disposition of those issues in relation to the proposed action and selection of a preferred alternative should be discussed.	Section 1.4.3 Section 3.3.2.2	The PA is not part of the project's EIS review, but is a separate consultation process. The PA replaces the Section 106 process and includes commitments among Foresight, Western, and the Forest Service to involve the Advisory Council on Historic Preservation, the Arizona State Historic Preservation Office, and Tribes in determinations regarding the effects to any properties for or eligible to the NRHP. Western would manage construction of the proposed switchyard. The Applicant would manage construction of the wind park and transmission tie-line. The Applicant's, Western's, and the Forest Service's goal is to achieve a no adverse effect by avoiding National Register-eligible cultural resources to the extent feasible and practical. The PA provides a process to: 1) identify previously recorded cultural resources and traditional cultural properties; 2) review reports of its archaeological identification efforts (Class III surveys); 3) determine eligibility for National Historic Register nomination of sites that would be unavoidably affected; and 4) move, modify, or cancel impacting activities to reduce or eliminate adverse effects to historic properties. Most of these activities would take place subsequent to the Final EIS. If Western cannot avoid an eligible historic property during construction of the proposed switchyard, or if the Applicant cannot avoid an eligible property during construction of the proposed wind park and transmission tie-line, a comprehensive Historic Properties Treatment Plan would be prepared and implemented. Tribes have been invited to participate in cultural resource surveys, and Hopi and Zuni members

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Comment No.	Comment	Revisions at	Response
			participated in field visits to date. A summary of the government-to-government consultation process was added to the EIS in Section 1.4.3 in response to this comment. The PA will be incorporated in the project record and is referenced in the EIS, but is not included in the Final EIS.
T-1.1	The proposed actions for the...project ***will not have an effect*** [emphasis original] on the White Mountain Apache Tribe's Cultural Heritage Resources and/or historic properties and at this point we do not believe it is necessary to contact and/or include the Tribe any further. Regardless, we further recommend that any/all ground disturbance should be monitored ***if*** [emphasis original] there are reasons to believe that human remains and/or funerary objects are present. If such remains and/or objects are encountered, all construction activities should be stopped and the proper authorities and/or affiliated Tribe(s) be notified to evaluate the situation.		In accordance with the PA, the White Mountain Apache Tribe will be informed of progress of the project through the Western and Forest Service consultation process. If any sites of Apache ancestry are discovered, Western or the Forest Service would contact the Tribe. Tribes also have been invited to participate in cultural resource surveys, and Hopi and Zuni members have participated in field visits to date. If there are reasons to believe that human remains and/or funerary objects are present, Western would oversee the development of a comprehensive HPTP. The specific strategies proposed would be developed in consultation with the PA signatories. Also, if such remains and/or objects are encountered, construction would be immediately halted and further construction would not be allowed within 200 feet of the discovery until a cultural resource specialist arrives to assess the discovery. If human remains and/or objects are encountered on Forest-managed lands, the Forest Service would address in accordance with the Native American Graves Protection and Repatriation Act. Pursuant to A.R.S. §41-844 and §41-865, an agreement regarding the treatment and disposition of human remains, funerary objects and objects of cultural patrimony would be developed by the Arizona State Museum for State and private land.
T-3.1	The (Navajo) Nation notes that the project area lies within both private and State trust lands, so it wants to emphasize its concern that there are numerous cultural sacred sites and request that the Navajo Nation be kept updated on the project's progress.		
T-3.2	If the proposed project inadvertently discovers Navajo habitation sites, plant gathering areas, human remains and objects of cultural patrimony, the Nation's Historic Preservation Department, Traditional Culture Program requests that it be notified in accordance with the Native America Graves Protection and Repatriation Act.		
T-2.2	The Hopi Tribe does not believe the PA will ensure protection of National Register-eligible archaeological sites and Traditional Cultural Properties as asserted.		
CULTURAL RESOURCES – ANALYSIS OF IMPACTS			
T-2.1	The Hopi Tribe considers the effects to Cultural Resources, areas of interest to Native Americans, and visual impacts on Traditional Cultural Properties to be adverse.	Section 3.3.2.2	The Tribe's comments have been received and reviewed. Class III Cultural Resource and Traditional Cultural Properties surveys for all potentially affected areas would be completed prior to project construction. For the EIS, a Class I records review has been completed for the up-to-500 MW project evaluation area, and a Class III

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T-2.3	Only a small percentage of the evaluation area has received a Class III survey, and therefore the Hopi Tribe does not believe the Draft EIS statement that, *"There would be no significant impacts to, or loss of a site of archaeological, Tribal or historical value that is listed, or eligible for listing, on the NRHP,"* or that *"there would be no adverse effect on cultural sites."* The commenter maintains this determination is based on insufficient data and is premature.		pedestrian survey has been completed for project elements on Forest-managed lands as well as the site access road. Western's and the Forest Service's goal is to achieve a *no adverse effect* by avoiding National Register-eligible cultural resources to the extent feasible and practical. The PA specifically includes a stipulation that should historic properties be identified during additional Class III inventory, Western in consultation with Foresight and consulting parties would attempt to move the impacting activity, modify the activity to reduce or eliminate adverse effects, or if possible, cancel the activity. Should none of these options be possible, Western would prepare a treatment plan following the guidance provided in the HPTP per stipulations in the PA. The EIS has been revised in Section 3.3.2.2 and the statement, "*Any unavoidable adverse impacts to cultural resources cannot be determined until the results of the Class III Survey and Traditional Cultural Properties Survey are completed*," has been removed since the PA includes stipulations to address discoveries and unanticipated effects, in addition to the stipulations defined above.
T-2.4	The Draft EIS acknowledges, *"Any unavoidable adverse impacts to cultural resources cannot be determined until the results of the Class III Survey and traditional Cultural Properties Survey are completed."* On page 194, however, the Draft EIS asserts, *"Because the proposed action is not likely to destroy NRHP-eligible sites, there would be no direct contribution to cumulative effects to cultural resources."*		
T-2.5	Therefore, we have determined that the project would cause significant adverse effects to biological resources, Hopi ancestral National Register-eligible archaeological sites, and Hopi Traditional Cultural Properties.		

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Comment No.	Comment	Revisions at	Response
VISUAL RESOURCES			
B-1.1	The commenter has no objection to the project overall, but having wind turbines extending 250–300 feet over the rim of Meteor Crater within just two or three miles would be very distracting to its visitors. Meteor Crater is a National Natural Landmark, and people come from all over the world to visit our location. When viewing the Crater, visitors are typically looking south or west. Having turbines on land that is within five miles south and west of Meteor Crater would be detrimental to the visitor's experience and could negatively affect our business. If turbines are located five miles or more from the location, the visitor experience would not be greatly affected because the intrusion into the viewshed would be much less.	Section 3.12.2.2	The Draft EIS notes that Meteor Crater is a National Natural Landmark designated by the National Park Service, and evaluates Meteor Crater visual resources and the potential for the project to impact visitors' experience. In evaluating impacts, the Draft EIS focused on views of the wind park from the Visitor Center patio and the rim of the crater that would experience minor and moderate adverse impacts, respectively. The relevant standard is the Coconino County Comprehensive Plan, Diablo Canyon RPA goal: "*Facilitate the development of alternative energy projects while maintaining the integrity of the ranches and preserving aesthetics and views*." This goal is further defined by the policy that wind projects "*shall be located at least one mile from major travel corridors, such as I-40 and SR 87*." The proposed project is consistent with this County goal. The EIS concludes that the permanent change created by introducing broad visual contrast into the natural landscape is an adverse impact that is minor to moderate (depending on the location of the viewer) and unavoidable. However, the changes that will occur with the wind park would not result in a deterioration of natural values on which the landmark designation is based. While the wind park would change the views at middle (0.5 to 4 miles) and background (beyond 4 miles) distances, the WTGs are not within the Meteor Crater boundaries and do not change the geologic features of the site. In addition, the WTGs locations and distance from the Meteor Crater are such that they would not be noticeable in the foreground views. In summary, Western determined that the WTGs would change the views from the site, but would not significantly impact the visitor's experience because the visitor's focus is on the crater itself and its history and geology. While visitors may enjoy the middle and background views from the site, those are not the primary features of the site. Finally, Foresight will consult with the management of Meteor Crater Enterprises during final design of the wind park to minimize visual impacts to middle and background views to the extent feasible.

TABLE 10.2-3
COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	Comment	Revisions at	Response
WATER RESOURCES – WETLANDS			
F-4.3	The commenter observes that the Draft EIS presents contradictory information on the presence of woody wetland habitat and requests clarification whether wetlands are present in the Grapevine Canyon Wind Resource Area and the project evaluation area.	Section 3.6.2.2	The Draft EIS did not identify wetlands within the project evaluation area. Rather, the impact analysis was based on existing remote sensing databases (as described in Sections 3.2.1.2 and 3.6.1.1). The 2001 National Land Cover Database (NLCD) developed from Landsat images was referenced to characterize the effected environment. The 2001 NLCD uses 21 class definitions to describe land cover types across the United States, including *Woody Wetland* that is defined as, "*Areas where forest or shrub land vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water*." This classification was mapped along the bottom of Grapevine Canyon, Canyon Diablo, and Jack Canyon. While *wetland* is in the title classification name, this mapping does not define whether wetlands exist within the limits of the project but rather establishes the potential for wetlands to occur. The Draft EIS also references the National Wetland Inventory which did not identify any vegetated wetland types within the limits of the project but did call out man-made stock ponds as potential impoundment areas. The Final EIS includes additional information about wetlands and waters of the U.S. in Section 3.6.2.2 and Table 3.6-3 based on a jurisdictional and wetland delineation performed for the wind park study area.
O-1.2	The EIS states that: *Wetland delineations have not been performed at this time but will be completed prior to project construction within areas subject to disturbance.* Wetlands and riparian areas are extremely important and limited habitat types. The EIS should disclose if wetlands and riparian areas will be impacted. These areas should be located and any potential impacts disclosed for consideration prior to a final decision on the project.	Section 3.2.1.2 Section 3.6.2.2	In response to this comment, a wetland delineation was performed for the wind park study area and the results are described in the Final EIS at Section 3.6.2.2. Information about wetlands and riparian areas is also found at Section 3.2.1.2.
WATER RESOURCES – WATERS OF THE U.S.			
F-4.4	The commenter recommends consultation with the Army Corps of Engineers to determine if the proposed project requires a Section 404 permit.	Table 2.7-1 Section 3.6.2.2	Foresight met with Arizona Branch of USACE and its project Manager for Coconino County in November 2010. A Section 404 permit will be required for the project. USACE indicated that individual phases of development could be considered for separate permits, provided the phases could be deemed separate and complete. For the initial phase to be separate and complete, the application would include the initial

TABLE 10.2-3
COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	**Comment**	**Revisions at**	**Response**
F-4.8	The commenter recommends that project alternatives be evaluated for compliance with Clean Water Act (CWA) Section 404(b)(1) guidelines for specifying disposal sites for dredged or fill materials. To demonstrate compliance, any permitted discharge must be based on the least environmentally damaging and most practicable alternative available to achieve the project purpose.		wind turbine area, the access and service road, collection system, transmission tie-line, and other related infrastructure in the initial phase area. Western will have responsibility for 404 compliance for its switchyard. The project anticipates projected impacts consistent with a nationwide permit for the initial phase and one or more subsequent phases, under current standards and under the pending standard updates scheduled for 2012. Under a nationwide permit a mitigation plan is not typically required. Project design is the least environmentally damaging and most practicable design available to achieve the project purpose. It takes into consideration the avoidance and minimization of impact to water resources. The project would comply with Section 404(b)(1), to the extent necessary, and the appropriate nationwide (or individual) permit will be in place prior to construction of the initial and subsequent phases. The Final EIS includes an additional RPM to ensure impacts would be minimized for jurisdictional waters of the U.S.
F-4.5	The commenter states that the results of a jurisdictional waters delineation by the USACE should be included in the Final EIS.		In response to this comment, an assessment of jurisdictional waters was prepared for the project study area in accordance with USACE Regulatory Guidance Letter 08-02. A preliminary jurisdictional determination was submitted to the USACE for the initial phase of the project in August 2011. The application included the initial wind turbine area, transmission tie-line, access road to the project, service roads, collection system, and step-up substation areas. The USACE determination is a separate process from the EIS analysis and the results may not be available at the time the EIS is published. A separate assessment for jurisdictional waters would be prepared for subsequent phases, once initiated.
F-4.6	The commenter is concerned that the impacts to aquatic resources, particularly in the wind park, may be underestimated. It recommends characterizing the functions of any aquatic features that could be affected by the project that are determined not to constitute waters of the United States.	Section 3.6.2.2 Table 3.6-3	In assessing potential impacts to aquatic resources, it is useful to know that the dominant terrain where disturbances would be made generally constitute rolling scrub-shrub plains. The run-off discharges from these plains accumulate into topographic depressions and generally direct flow to the Diablo and Grapevine canyons. As flow accumulates, upland depressions transition to more defined washes and scour of the surficial soil unit and underlying sandstone/limestone formations is present. Some of the formations show signs of an ordinary high water mark. Others do not. In response to this comment, a table was prepared for the Final EIS to depict estimated impacts to waters for the build-out area that would be

TABLE 10.2-3
COMMENT RESPONSES – RESOURCE ANALYSIS

Comment No.	Comment	Revisions at	Response
F-4.7	The commenter recommends the Final EIS include a table and clear narrative on the direct, indirect, secondary, and temporary impacts to waters, including wetlands, from infrastructure, particularly roads. It recommends quantifying the potential impacts to waters of the U.S. and discussing the steps that would be taken to avoid and minimize impacts, including mitigation plan as required by USACE and EPA regulations.		developed in the initial phase. The project anticipates projected impacts consistent with a nationwide permit for the initial phase and one or more subsequent phases, under current standards and under the pending standard updates scheduled for 2012. The RPM added to the Final EIS is based on a three-tiered approach to minimizing impacts. The tiered approach focuses on: 1) avoidance as the primary mechanism to limit impacts to jurisdictional waters; 2) where avoidance cannot be achieved, impacts are minimized through configuration of project to minimize the quantity of jurisdictional waters impacted; and 3) the implementation of engineering controls to further limit impacts where practicable. Engineering controls include culverts and low water crossings to maintain the flow conditions to downstream reaches and energy dissipation treatments where discharge estimates (for storms up to and including the 100-year return storm event) indicate erosive conditions may exist.
F-4.9	The commenter recommends the Final EIS provide additional information on the functions and locations of ephemeral washes in the project area and their hydrologic and biogeochemical roles in relationship to higher-order waters downstream.		
F-4.10	The commenter recommends that ground disturbance be minimized in ephemeral washes to reduce impacts. Potential damage that could result from the disturbance of flat-bottomed washes includes adequate capacity for flood control, energy dissipation, sediment movement, and high-value habitat for desert species.		
CUMULATIVE EFFECTS			
F-4.24	The commenter recommends that an illustration of the location of the Sunshine Wind Project be added to the cumulative impact analysis.	Figure 4.2-1	A map which shows the location of the Sunshine Wind Project is included, see Figure 4.2-1.
S-2.9	Golden eagles should be considered in the cumulative effects analysis.	Section 4.2.3.2	Based on this comment, the cumulative effects Section has been updated to address golden eagles. Additional text has been added to Section 4.2.3.2

10.3 COMMENT DOCUMENTS

Western received 15 comment documents (letters, emails, comment card, and hearing testimony) as of September 7, 2011. It received three additional agency documents as of September 13, 2010 and included these in its review. All materials are listed in the Comment Document Index (Index) below and reproduced here.

8/16/2010

Mr. Mike Dechter
Coconino National Forest
1824 South Thompson St.
Flagstaff, AZ

Dear Mr. Dechter,

I have received the draft EIS for the Grapevine Canyon Wind Project. Upon reviewing the map, I noticed that part of the "study area" for the project included land that was within just two miles of Meteor Crater. This is of great concern to us.

B-1.1

I want to be clear that we have no objection to the project overall, but having wind turbines extending 250-300 feet over the rim of Meteor Crater within just two or three miles would be very distracting to our visitors. Meteor Crater is a National Natural Landmark, and people come from all over the world to visit our location. When viewing the Crater, our visitors are typically looking south or west. Having turbines on land that is within 5 miles south and west of Meteor Crater would be detrimental to our visitor's experience and could negatively affect our business.

I have included the map of the study area that shows the area of concern inside a red circle. If the turbines are located 5 miles or more from our location, our visitor's experience would not be greatly affected because the intrusion into the view shed would be much less. We would however strongly object to turbines being built at a distance less than 5 miles from Meteor Crater.

Sincerely,

Brad Andes, President
Meteor Crater Enterprises, Inc.

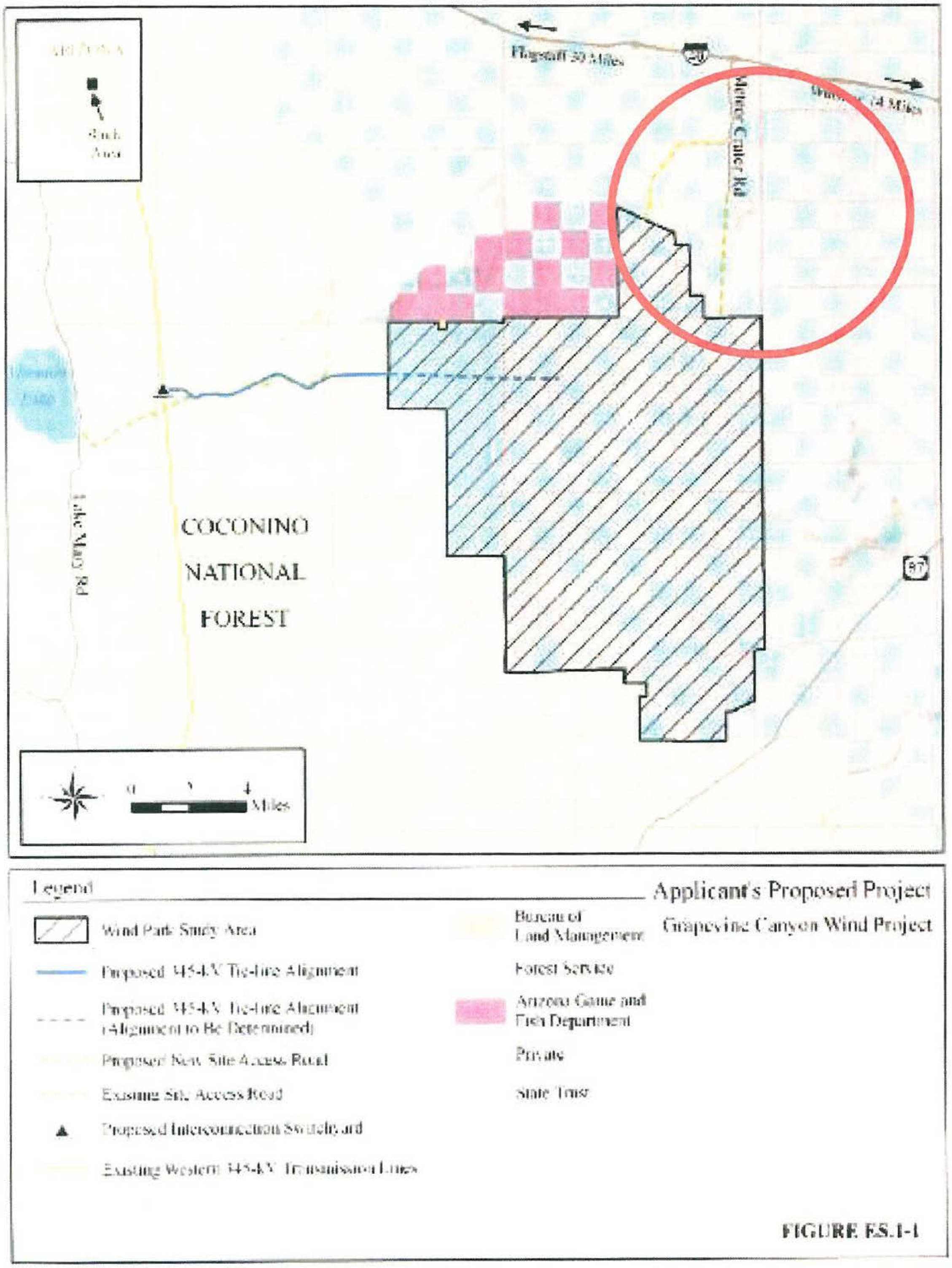

FIGURE ES.1-1

Grapevine Canyon Wind Project – Environmental Impact Statement ii

TRANSCRIPT OF HEARING ON DRAFT EIS

GRAPEVINE CANYON WIND PROJECT
COCONINO COUNTY, ARIZONA

HOSTED BY: Western Area Power Administration
Lakeland, Colorado

Flagstaff, Arizona
Wednesday, August 18, 2010
7:00 - 9:00 p.m. (MST)

ORIGINAL

PERFORMANCE REPORTERS, INC.
121 East Birch Avenue, Suite 501
Flagstaff, Arizona 86001
TELEPHONE: (928) 213-1040

REPORTED BY:
JOHN A. DALSIN, RPR
AZ CCR NO. 50270

your address?

And you have five minutes, since we have only limited speakers here.

ORAL COMMENTS

MR. ROCK: Thank you very much.

My name is Ty Rock. The address is 30 Creek Rock Circle, Sedona, Arizona 86351.

I have various concerns, but I think the only two I will address tonight are access and decommission of the project, if that is the future of it.

On Page 53 of the EIS, there's a note there that indicates that during the construction and operation of the farm the permittee will possibly contact the Arizona Game and Fish Department ombudsman for closing of the area to hunting.

C-1.1

I can understand the closing the area for construction -- for the safety issue, of course -- but I am having difficulty with the operation phase of the project.

At the initial scoping meeting we had, we were assured that the public would have access to the entire project after the completion of the construction of the wind farm. I would like clarification on that.

The other issue I have is: At the

C-1.2

initial scoping meeting as well, we were told that there was going to be a decommission bond that would be required before any construction could be started on the project. And the EIS specifically indicates that that wasn't even addressed.

My concern, of course, is what we have in California, southern California, with the corporations that actually went broke, and we now have monuments to man's ingenuity standing up there with nothing to -- with no funds to decommission that facility. And so I'd like clarification on that as well.

I think that probably will do it for this evening. I do have other concerns, but I believe I will put those in writing and send them in.

THE HEARING OFFICER: Thank you, Mr. Rock.

MR. ROCK: Thank you for the opportunity.

THE HEARING OFFICER: Are there any other persons that have signed up for comments to speak this evening?

(No audible response.)

THE HEARING OFFICER: We will hold comments open for the allotted time, from 7:00 until 9:00 o'clock, if other people want to speak.

There are representatives from the Forest Service, from Western Area Power, the contractors, the

Grapevine Canyon Wind Project

We Welcolme Your Comments

Your comments will help ensure we've addressed all relevant issues and alternatives in the Grapevine Canyon Wind Project Draft Environmental Impact Statement.

Please provide your comments by September 7, 2010 to:

Matt Blevins Western Area Power Administration P.O. Box 281213 Lakewood, Colorado 80228-8213 Telephone: 800-336-7288 FAX: 720962-7263 E-mail: grapevinewindeis@wapa.gov	OR	Mike Dechter Coconino National Forest 1824 S. Thompson St. Flagstaff Arizona 86001 E-mail: comments-southwestern-coconino@fs.fed.us

Receive future announcements about the Grapevine Canyon Wind Project

To have your name added to or removed from our mailing list for this project, check the appropriate box and complete the contact information below.

☐ Yes, add my name to the mailing list to receive future information. Please send me information by **regular mail** only.

☒ Yes, add my name to the mailing list to receive future information. Please send me information by **E-mail**.

☐ No, please remove my name from your mailing list.

C-2.1 • concerned about controlling access to park as mentioned on pg 155 of draft EIS, Locked gates on private parcels may preclude entrance into public lands.

C-2.2 • on page 63 of EIS – who is going to be "monitoring" access to wind park & how?

C-2.3 • page 54, paragraph 1, how does "mitigation" avoid adverse impacts to wildlife?

C-2.4 • page 56 of EIS – what purpose for post-construction monitoring of wildlife, when construction is complete it will not be torn down because of adverse wildlife impact,

C-2.5 • page 43 of EIS – How is the mortality of any protected species of bird or raptors mitigated?

C-2.6 • page 30 of EIS discusses post-construction reclamation – what entity will oversee this phase of the project & will the public have input. what consequences will there be to the permitee for non-compliance?

C-2.7 • page 162 – Noise impact on wildlife – Studies have shown that when project is completed at full build-out, Antelope may not re-enter the wind park at all. Research is inconclusive on this aspect of windfarms,

C-2.8 • page 182 suggests that if the project is decommissioned the facilities MAY be removed and the area of disturbance may be reclaimed. understanding of the word MAY is of concern.

C-2.9 • page 53 notes that the applicant would consult with AG&F ombudsman and file a petition with the AG&F Commission in the event an area requires a hunting closure during construction or operations. A closure for construction can be understood due to safety concerns but during operation of the wind park violates what the public has been told regarding access post construction.

C-2.10 • Does the wind park actually produce sufficient electrical energy to offset the building of components, construction of the wind park and completion of all legal requirements?

Meeting Attended: ☒ Flagstaff ☐ Mormon Lake

Your Name: Ty Rock **E-Mail:** redrock@verdeonline.com

Address 30 Creek Rock Circle **City** Sedona **State** Az **Zip** 86351

Please provide your name and contact information if you wish to receive future information on this project

-----Original Message-----
From: GrapeVineWindEIS GrapeVineWindEIS [mailto:GrapeVineWindEIS@wapa.gov]
Sent: Sunday, August 15, 2010 7:51 AM
To: Leah_Baker@blm.gov
Subject: Re: Fw: ENVIRONMENTAL REVIEW (ER) NEW POSTING NOTIFICATION: ER 10/652

Thank you for your input.

>>> <Leah_Baker@blm.gov> 8/13/2010 3:51 PM >>>

F-1.1 In review of the proposed project described below, the BLM Phoenix District has no concerns with the plan. While the proposed plan is adjacent to a small parcel of BLM land, it poses no resource concern. Consultation was conducted with our Lands and Realty Specialist, Cultural Resource Specialist, and Wildlife Biologist.

Thank you.
. . . .
. .
Leah Baker
Planning & Environmental Coordinator
Bureau of Land Management
Phoenix District Office
623.580.5656

----- Forwarded by Chris Horyza/AZSO/AZ/BLM/DOI on 07/30/2010 10:17 AM

Brenda Hudgens-Williams/WO/BLM/DOI
07/30/2010 09:05 AM

To: Chris Horyza/AZSO/AZ/BLM/DOI@BLM
cc:
Subject: Fw: ENVIRONMENTAL REVIEW (ER) NEW POSTING NOTIFICATION: ER 10/652

1

This e-mail alerts you to an ER request from the Office of Environmental Policy and Compliance (OEPC). To access electronic ERs visit the OEPC Natural Resources Management Team website at:
http://www.doi.gov/oepc/nrm.html Under Quick Links select: Environmental Review Distributions (Bureau ER Notifications). For assistance, please contact the Natural Resources Management Team, at 202-208-5464.

[attachment "ER10-652 (DEIS- Grapevine Canyon Wind Project Project, Coconino County, AZ, .pdf).pdf" deleted by Leah Baker/PDO/AZ/BLM/DOI]

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:

AESO/SE
22410-2010-TA-0346
20120-2009-FA-0075

September 8, 2010

Mr. Matt Blevins
Western Area Power Administration
Post Office Box 281213
Lakewood, Colorado 80228-8213

RE: Grapevine Canyon Wind Project Draft Environmental Impact Statement (DOE/EIS-0427)

Dear Mr. Blevins:

Thank you for your July 20, 2010, request for comments regarding the Grapevine Canyon Wind Project (GCWP) Draft Environmental Impact Statement (DEIS), Coconino County, Arizona. The document was prepared by the U.S. Department of Energy (DOE) and Western Area Power Administration (Western), in cooperation with the Coconino National Forest and the Arizona State Land Department (ASLD). The GCWP, proposed by Foresight Flying M, LLC, would include: 1) a wind energy generating facility up to 500 megawatts (MW); 2) a 345-kilovolt (kV) electrical transmission tie-in line; and 3) a 345-kV electrical interconnection switchyard that would be owned and operated by Western. The wind energy generation component would be located on private land and trust land administered by the ASLD. The electrical transmission tie-line would be located on private and State trust lands, as well as Federal lands administered by the Forest Service. The interconnection switchyard would be located entirely on National Forest System lands. The project is located 28 miles south and east of Flagstaff, Arizona, extending from the proposed wind park south of Meteor Crater to the proposed switchyard east of Mormon Lake.

The Fish and Wildlife Service (FWS) supports the development of nonpolluting, renewable, sustainable energy sources. However, wind energy developments do pose risks to wildlife and their habitats. Additional information on wind energy and wildlife issues can be found on our website, www.fws.gov/habitatconservation/wind.html, which includes the Interim Guidance on Avoiding and Minimizing Impacts to Wildlife from Wind Turbines (Guidelines). In addition to the interim guidelines, the Wind Turbine Guidelines Advisory Committee (Committee) was established in 2007 under the Federal Advisory Committee Act to provide advice and recommendations to the Secretary of the Interior (Secretary) on developing effective measures to avoid or minimize impacts to wildlife and their habitats related to land-based wind energy projects. On March 4, 2010, the Committee provided their final recommendations to the

Mr. Matt Blevins 2

Secretary. Though these voluntary recommendations have not been formally accepted by the Secretary, they do represent the most current synthesis of the state-of-our-knowledge regarding how to minimize the potential risk of wind energy projects to wildlife and habitats. The Arizona Game and Fish Department (AGFD) has also created Wind Energy Guidelines entitled *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona*. These guidelines can be found on their website at http://www.azgfd.gov/hgis/guidelines.aspx. We use all three documents to support our recommendations regarding the GCWP.

The comments provided below are organized according to the sections of the DEIS, with pages and paragraphs noted as appropriate.

Construction of Electrical Collection System and Communications System (page vi): The DEIS states that the electrical collection system and communications system would be co-located within the wind park study area, adjacent to the wind turbine generator (WTG) service roads to the extent possible. Up to approximately 241 miles of 34.5-kV collection lines and fiber optic cables are estimated if the project is built out to 500 MW. The majority of the lines would be underground. We support your efforts to put a majority of the power lines underground as this will reduce impacts to raptors at the site. We recommend that you follow these trenching guidelines from AGFD:

F-2.1

- Follow existing disturbed areas during installation to minimize habitat alterations. In low areas where the power line crosses drainages, the soil should be compacted to reduce the potential for erosion.
- Trenching and backfilling crews should be close together to minimize the amount of open trenches at any given time.
- Trenching should occur during the cooler months (October – March) when wildlife is less active. However, there may be exceptions (e.g., critical wintering areas) that should be assessed on a site-specific basis.
- Avoid leaving trenches open overnight.
- Where trenches cannot be back-filled immediately, escape ramps should be constructed at least every 45 meters. Escape ramps can be short lateral trenches or wooden planks sloping to the surface. The slope should be less than 45 degrees (1:1). Trenches that have been left open overnight should be inspected and animals removed prior to backfilling.

F-2.2

Meteorological Towers (page vii): The DEIS states that the existing temporary meteorological (met) towers will be maintained until construction is complete and that up to 16 long-term or permanent met towers would be used to monitor wind conditions at the site if the wind park is built out to 500 MW. These met towers would be free-standing structures, approximately 263-feet tall and constructed of steel lattice. We commend you for avoiding the use of guy-wires on these towers. The Committee's Final Recommendations submitted to the Secretary recommend avoiding the construction of permanent met towers at wind energy project sites. However, we understand that there may be a need for permanent met towers at the project site. Although it is unclear whether tubular or lattice towers reduce risk of collision, we recommend using tubular towers or the best available technology to reduce the ability of birds to perch and to reduce risk of collision. In addition, towers should employ only red, or dual red and white strobe,

strobe-like, or flashing lights, not steady burning lights, to meet Federal Aviation Administration requirements for visibility lighting of wind turbines, permanent met towers, and communication towers. Only a portion of the turbines within the wind project should be lighted, and all pilot warning lights should fire synchronously.

F-2.3 **Table ES.5-1, Biological Resources** (page xiv): This table lists two species, the Chiricahua leopard frog (*Lithobates chiricahuensis*) and the narrow-headed gartersnake (*Thamnophis rufipunctatus*), as species that have a low potential to occur within the area. These species do not occur within the project area or anywhere within dispersal distance of the project area (i.e., they have no potential to occur within the action area). Trust species for which we do have concern for adverse impacts include raptors, specifically the golden eagle (*Aquila chrysaetos*), migratory birds, and other FWS Birds of Conservation Concern. The closest amphibian of concern to the project area is the northern leopard frog (*Lithobates pipiens*). This sensitive species occurs on Anderson Mesa and likely has a greater chance of occurring within the project area over time than the herpetological species listed above.

Table 1.3.1 (page 6): The table states that the Fish and Wildlife Service's (FWS) regulatory and/or authorization authority only includes Section 7, Endangered Species Act (ESA) F-2.4 Consultation. We recommend correcting this table to state that FWS authorizations include the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA), in addition to the ESA, as indicated.

F-2.5 The MBTA prohibits the taking, killing, possession, and transportation, (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. While the MBTA has no provision for allowing unauthorized take, the FWS realizes that some birds may be killed during wind operations even if all known reasonable and effective measures to protect birds are used. The FWS Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to avoid take of migratory birds, and by encouraging others to implement measures to avoid take of migratory birds. It is not possible to absolve individuals, companies, or agencies from liability even if they F-2.5 implement bird mortality avoidance or other similar protective measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without identifying and implementing all reasonable, prudent, and effective measures to avoid that take. Companies are encouraged to work closely with FWS biologists to identify available protective measures when developing project plans and/or avian protection plans, and to implement those measures prior to or during construction or other similar activities.

F-2.6 **2.2.1.3, Operation and Maintenance of the Wind Park,** *Operating Schedule* (page 27): The DEIS states that the GCWP would operate 24 hours per day, 365 days per year. We request that you consider operational flexibility to allow particular turbines to be turned off during certain times to avoid negative impacts on wildlife, particularly migratory birds or bats. Curtailment strategies, such as reducing cut-in speeds, may be another effective mitigation strategy to reduce bat fatalities. We recommend that the operating schedule, its potential effects, and possible minimization measures be included in the Avian Bat Protection Plan (ABPP) currently under development.

F-2.7 ***Threatened, Endangered, and Sensitive Wildlife Species***: Wind Park (pages 89-90): This section discusses two species: the threatened Chiricahua leopard frog and the candidate narrow-headed garter snake. As we stated earlier, neither of these species is likely to be impacted by the proposed wind project. However, there are trust species missing from this section that we believe should be addressed more fully within the DEIS and not left to discussion in reports in the appendices. We recommend that the final EIS include information regarding potential impacts to the following species:

F-2.8 **Golden eagle**: The population status of golden eagles breeding in the Southwest and other western states is currently uncertain; however, many experts believe the species is declining. Two "inactive" golden eagle nests were documented during raptor nest surveys (aerial survey in April 2008 and a ground-based raptor nest survey in June 2008). However, this information is based upon one year of surveys and with two potential golden eagle nests in the center of the project area it is possible that golden eagles did not use the territory in 2008 or attempted nesting earlier and failed. Nesting by golden eagles tends to be cyclic in the western U.S., and during some years breeding pairs may occupy territories but not lay eggs. Even though the pre-construction survey data suggests that avian mortality overall would be average (compared to other facilities), the conclusion does not take into account the species-specific probability of mortality, which is very high for golden eagles. Placement of turbines in or near prairie dog towns (within four miles, based upon foraging distances in published literature), should be avoided until additional surveys (e.g., intensive observation, telemetry, etc.) can be conducted. At the very least, we recommend an additional year of pre-construction raptor surveys in order to better evaluate the risk to golden eagles from the proposed project.

The golden eagle is protected under the BGEPA. The FWS finalized permit regulations under the BGEPA for the take of bald and golden eagles on a limited basis, provided we determine that the take is compatible with preservation of the eagle and cannot be practicably avoided. For the purposes of these regulations, "preservation of the eagle" means "consistent with the goal of stable or increasing breeding populations." Under the section on programmatic permits, wind-power facilities are discussed. On page 46842, the final rule states that if advanced conservation practices (ACPs) can be developed to significantly reduce take, the operator of a wind-power facility may qualify for a programmatic take permit. ACPs refer to scientifically-supportable measures that are approved by the FWS and represent the best-available techniques to reduce eagle disturbance and/or on-going mortalities to a level where remaining take is unavoidable. Though we have not received your ABPP yet, at our July 12, 2010, meeting regarding this project, we were told we would be provided an opportunity to evaluate the ABPP. We look forward to working with project personnel in evaluating the ABPP.

F-2.9 **FWS Birds of Conservation Concern (BCC)**: The DEIS does not specifically discuss these species, which are demonstrating population declines and may be considered for candidate status under the ESA without concerted conservation efforts. The project area lies at the edge of Bird Conservation Regions 16 and 34, and regional and national lists are posted at http://library.fws.gov/bird_publications/bcc2008.pdf. Though we recommend a thorough review of these lists, they do change every few years, and focus should remain on potential effects to all migratory birds that occur in the U.S. and are protected under MBTA. Specifically, the pinyon jay may be at relatively high-risk of collision with project infrastructure, and the ABPP may want to specifically address means to minimize impacts to this BCC.

F-2.9 Abundance of birds, particularly passerines, was substantial at point count plot nine (average of 36 birds/20 minute survey) and it is possible that turbine placement in this area could result in high levels of mortality. We recommend that in the ABPP, the vegetation, topography, and other site characteristics be scrutinized to determine why avian abundance is higher at this site and possibly sites with similar characteristics that were not surveyed. WTG siting should be avoided until additional surveys indicate whether high levels of bird mortality are likely. In addition, we also noted that displacement impacts to birds are not addressed in the DEIS. We recommend including in the ABPP a review of the potential displacement impacts and habitat disturbance effects that may result to migratory birds and the BCC within the project area and how the proposed construction and site management best management practices may reduce these effects.

F-2.10 In our review of the proposed action, we also noted that no nocturnal bird surveys were conducted. Additionally, point count surveys were conducted during mid-day, which is optimum timing for many species of diurnal raptors, but not a good time to detect many passerines. We recommend that this information is acknowledged in the ABPP and final DEIS. We also recommend that burrowing owl surveys be conducted in the early morning (preferred) or late evening along prairie dog towns, roads, and trails.

F-2.11 **Other raptors**: Relatively high raptor abundance was documented by WEST, Inc. near prairie dog towns within the proposed project area. Based upon the moderate level of raptor abundance (mean 0.67 observed/20-minute survey), WEST, Inc. predicted 0.10 raptors killed/MW/year. At 500 MW, about 50 raptors could be killed annually as a result of the GCWP (although based on 90% confidence intervals, 0 to 175 raptors could be killed annually). The greatest raptor abundance noted among 24 point count plots occurred at three plots that were within or adjacent to prairie dog towns. Raptors, especially golden eagles and red-tailed hawks, will be vulnerable to collision with any turbines placed in these areas. This should be addressed in the ABPP.

F-2.12 **Table 2.7.1** (page 55): We recognize that a biological inventory and one year of pre-construction data have been completed for Site A. However, we strongly recommend that additional work be completed to appropriately assess the risk of avian and bat impacts from the GCWP. We recommend that the project proponents consider GCWP a Category 3 project site per AGFD's guidelines. Category 3 sites have high or uncertain potential for wildlife impacts involving birds and/or bats, special status species, or other species. Characteristics that indicate high potential wildlife impacts at the GCWP site include the number of proposed turbines and project size, special status species occurring on or adjacent to the site (e.g., golden eagles), and

F-2.12

the presence of current and historic prairie dog colonies that may concentrate raptor activity. As a Category 3 site, the following would need to be completed prior to construction:

- Complete biological inventories for Sites B and C prior to construction in Site A;
- Collect at least two years of pre-construction bird and bat data, with special attention to characterizing seasonal and spatial variability in species use, prior to construction in Site A; and,
- Design a post-construction monitoring plan to assess the impacts of operation on wildlife for at least three years following construction.

F-2.13

As you know, a goal of the pre- and post-construction studies is to inform the turbine arrangement and operating schedules for wind projects. Negative impacts to species can be minimized with tower configuration that uses clustering to minimize gaps and that incorporates non-bladed pylons at string edges. In addition, turbines sited on mesa rims should be placed at least 50 meters (closest rotor) from the rim edge to minimize impacts to raptors.

F-2.14

Table 2.7.1 (page 56): We strongly recommend that you complete post-construction bird and bat fatality monitoring for at least two years. The DEIS states that only one year of post-construction monitoring would be completed. In addition, we recommend that all bats collected during mortality searches are offered as a donation to the to the American Museum of Natural History for their ongoing North American Bat Samples for Genomic and Stable Isotope Studies, http://research.amnh.org/vz/mammalogy/batdonation.

Finally, we request that you provide us with a copy of all final decision documents associated with this project. Final decision documents include the issued permit or license, final environmental impact statement, record of decision, integrated natural resource management plan, or similar document. These decision documents advise us of the final specifications of the proposed project and indicate which of the measures recommended for the conservation of fish and wildlife resources were implemented.

The FWS's coordination, including this letter, is provided as technical assistance. Ultimately it is the responsibility of those involved with the planning, design, construction, operation and maintenance of the proposed project to complete a risk assessment, determine the likelihood of taking federally-protected species, and pursue the appropriate course of action. By taking extra effort and expense initially (during design and construction phases) to minimize your project's impacts on wildlife and their habitats, you can help to ensure that your project will meet the environmental expectations of an increasingly concerned public for many years into the future. We will assist you in this process and appreciate the many efforts included in the DEIS that will minimize wildlife impacts from this project. We appreciate the opportunity to review DEIS and we look forward to evaluating the ABPP.

We also encourage you to coordinate the review of this project with the AGFD. In all future correspondence on this project, please refer to consultation number 22410-2010-TA-0346.

Mr. Matt Blevins 7

Should you require further assistance or if you have any questions, please contact Shaula Hedwall (x103) or Brenda Smith (x101) of our Flagstaff Suboffice at (928) 226-0614.

Sincerely,

Steven L. Spangle
Field Supervisor

cc: (electronic)
IPM Coordinator and NEPA, Fish and Wildlife Service, Kellyville, OK (Attn: Dean Heckathorn)
Environmental Protection Specialist, Division of Habitat and Resource Conservation, Fish and Wildlife Service, Arlington, VA (Attn: Stephanie Nash)
Alternative Energy Coordinator, Regional Office, Fish and Wildlife Service, Albuquerque, NM (Attn: Laila Lienesch)
Division of Migratory Birds, Regional Office, Fish and Wildlife Service, Albuquerque, NM (Attn: Robert Murphy)
Nicholas Chavez, Special Agent in Charge, Regional Office, Fish and Wildlife Service, Albuquerque, NM
Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff, AZ
Fish and Wildlife Biologist, Fish and Wildlife Service, Phoenix, AZ (Attn: Greg Beatty)
Environmental Protection Agency, San Francisco, CA (Attn: Ann McPherson)
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Flagstaff, AZ
Forest Supervisor, Coconino National Forest, Flagstaff, AZ
Forest Biologist, Coconino National Forest, Flagstaff, AZ

W:\Shaula Hedwall\DEIS Grapevine Canyon Wind Project 9-3-10.docx: jkey

United States Department of the Interior

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Office of Environmental Policy and Compliance
Pacific Southwest Region
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IN REPLY REFER TO:
ER# 10/652

Electronically Filed

10 September 2010

Mr. Matt Blevins
Western Area Power Administration
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Lakewood, CO 80228-8213
Telephone: (800) 336-7288
Fax: (720) 962-7263
E-mail: GrapevineWindEIS@wapa.gov

Subject: Draft Environmental Impact Statement of the Western Area Power Administration's Grapevine Canyon Wind Project, Coconino County, AZ

Dear Mr. Blevins:

Department of the Interior has received and reviewed the subject document and has the following comments to offer.

General Comments:

Chapter 3: Affected Environment and Environmental Consequences, Section 3.2 Biological Resources, pages 84- 106:

F-3.1 The public would benefit from inclusion of a discussion of available scientific information regarding impacts of wind energy projects on bird and bat species. Based on that information, it would help to include an assessment of mitigation options to avoid or significantly reduce impacts on these species from proposed project. Final EIS could include information from Wyoming wind-turbine data developed by U.S. Geological Survey (O'Donnell and Fancher, 2010) for comparison purposes with proposed project. These data help evaluate effects of wind energy development on seasonal habitat used by greater sage-grouse. Spatially explicit seasonal distribution models of sage-grouse in Wyoming will provide resource managers with tools for conservation planning and assessing effect of disturbance resulting from wind energy development on sage-grouse populations.

F-3.2 Although considerable progress has been made in recent years toward better understanding impacts and proposed mitigation options for bat species, bats of certain species are dying at wind

F-3.2 turbines in unprecedented numbers, and causes of bat fatalities at turbines remain unclear. It would, therefore, be beneficial for the final EIS to include the synthesis of hypothesized causes of bat fatalities at wind turbines from study by Cryan and Barclay (2009). It would also benefit the public to include scientific information from other studies that suggest that mating behavior has been identified as a possible cause of bat fatalities at wind turbines (Cryan, 2008) and that certain species of bats are particularly susceptible to mortality from wind turbines (Cryan, 2006).

Thank you for the opportunity to review and comment on the DEIS. If you have any questions concerning our comments, please contact Gary LeCain, USGS Coordinator for Environmental Document Reviews, at (303) 236-5050 (x229) or at gdlecain@usgs.gov

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC
DOE, WAPA
Senior, advisor USGS

REFERENCES:

Cryan, P.M. and R.M.R. Barclay. 2009. Causes of bat fatalities at wind turbines: Hypotheses and predictions. Journal of Mammalogy 90(6): 1330-1340.

Cryan, P.M. 2008. Mating behavior as a possible cause of bat fatalities at wind turbines. Journal of Wildlife Management 72(3): 845-849.

Cryan, P. 2006. Bat fatalities at wind turbines: Investigating the causes and consequences. http://www.fort.usgs.gov/products/publications/pub_abstract.asp?PubID=22200/.

O'Donnell, M.S., and Fancher, T.S., 2010, Spatial mapping and attribution of Wyoming wind turbines: U.S. Geological Survey Data Series DS 524, http://pubs.usgs.gov/ds/524, or http://www.fort.usgs.gov/Products/Publications/pub_abstract.asp?PubID=22954.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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SEP 1 3 2010

Matt Blevins
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228-8213

Subject: Draft Environmental Impact Statement for Grapevine Canyon Wind Project, Coconino County, Arizona [CEQ# 20100264]

Dear Mr. Blevins:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the Grapevine Canyon Wind Project, Coconino County, Arizona. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

EPA supports increasing the development of renewable energy resources, as recommended in the National Energy Policy Act of 2005, in an expeditious and well planned manner. Using renewable energy resources such as wind power can help the nation meet its energy requirements while reducing greenhouse gas emissions. Given the large number of renewable energy project applications currently under consideration, particularly in the Desert Southwest, we believe it is imperative that project applicants coordinate early with federal agencies and stakeholders on site selection and project design in order to facilitate timely environmental reviews. We encourage federal agencies to apply land management and regulatory authorities in a manner that will promote a long-term sustainable balance between available energy supplies, energy demand, and protection of ecosystems and human health.

Foresight Flying M, LLC (Applicant) has submitted an application to the Western Area Power Administration (Western) to interconnect the Grapevine Canyon Wind Project (Proposed Project) to Western's power transmission system. The Proposed Project includes: a wind generating facility (wind park) up to 500 megawatts (MW); a 15-mile 345-kilovolt (kV) electrical transmission tie-line; and an interconnection switchyard.

Based on our review of the subject DEIS, we have rated the document as *Environmental Concerns – Insufficient Information* (EC-2). Please see the enclosed "Summary of Rating Definitions." An "EC" signifies that EPA's review of the DEIS has identified environmental impacts that should be avoided in order to provide adequate protection for the environment. A "2" rating signifies that the DEIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment.

In the enclosed detailed comments, we provide specific recommendations regarding

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analyses and documentation to assist in assessing potential significant impacts from the proposed Project. EPA is concerned about potential impacts on aquatic resources, bats, and avian species, particularly the bald eagle and golden eagle; the alternatives analysis; and the discussion of air quality and climate change. We are also concerned by the lack of details provided in the DEIS about the design and layout of the proposed wind park. Although the wind park would be located on private and State trust lands, it appears to be dependent on the federal permitting of the transmission line and the construction and operation of the electrical switchyard on Federal lands. Thus, the impacts of constructing and operating the wind park are considered relevant to Western's approval or denial of the interconnection request. Without more detailed information on the size, location, and number of wind turbine generators, it is difficult to evaluate the full extent of impacts of Western's action.

F-4.18

We recommend that the Final Environmental Impact Statement (FEIS) include more detailed information on the design and layout of the proposed wind park. In addition, we recommend that the Applicant consult with the U.S. Corps of Engineers to determine if a Clean Water Act Section 404(b) permit will be required. The FEIS should quantify the potential impacts to waters of the U.S. and discuss the steps that would be taken to avoid and minimize such impacts. Regarding our concerns about avian and bat species, we recommend that the Applicant work closely with the U.S. Fish and Wildlife Service in the development of the Avian and Bat Protection Plan. The FEIS should clarify how the Applicant will comply with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. We also recommend that the Applicant complete pre-construction surveys of wildlife in all areas of the proposed wind park prior to construction, and conduct post-construction surveys of raptors for at least two years. Finally, we recommend that the Applicant utilize the most effective techniques and technology (e.g. bird and bat radar systems, feathering of blades, and shut down of turbines during strategic intervals to reduce take) to ensure maximum avoidance of bird and bat strikes.

EPA appreciates Western's coordination to date and the opportunity to provide input on this Project. If you have any questions, please contact me at (415) 972-3521, or contact Ann McPherson, the lead reviewer for this project. Ann can be reached at (415) 972-3545 or mcpherson.ann@epa.gov.

Sincerely,

Kathleen M. Goforth

Kathleen M. Goforth, Manager
Environmental Review Office

Enclosures: EPA Summary of Rating Definitions
EPA Detailed Comments

cc: Sally McGuire, U.S. Army Corps of Engineers
Shaula Hedwall, U.S. Fish and Wildlife Service
Reuben Ojeda, Arizona State Land Department
Mike Dunbar, Coconino National Forest

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Chairman Leroy Shingoitewa, Hopi Tribe
Chairman Joe Shirley, Jr., Navajo Nation
Governor Norman Cooeyate, Zuni Pueblo

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

U.S. EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE GRAPEVINE CANYON WIND PROJECT, COCONINO COUNTY, ARIZONA, SEPTEMBER 13, 2010

Foresight Flying M, LLC (Applicant) has submitted an application to the Western Area Power Administration (Western) to interconnect the Grapevine Canyon Wind Project (Proposed Project) to Western's power transmission system. The Proposed Project includes: a wind generating facility (wind park) up to 500 megawatts (MW); a 15-mile 345-kilovolt (kV) electrical transmission tie-line; and an interconnection switchyard. The wind park study area would encompass almost 100,000 acres of private land and State trust lands administered by the Arizona State Land Department. The electrical transmission tie-line would extend across 8.5 miles of Forest Service lands and up to 6.5 miles of State trust and private lands. The interconnection switchyard would be located on a 15-acre parcel on Forest Service land. The Forest Service will approve or deny the special use permit authorizing a right-of-way (ROW) for that portion of the 345-kV tie-line crossing Forest Service lands as well as the 15-acre parcel for the switchyard. Western will approve or deny the interconnection request. The project is located about 28 miles southeast of Flagstaff, Arizona in Coconino County.

Detailed Description of the Proposed Project

EPA is concerned that the DEIS provides an insufficient level of detail about the size, layout, and design of the proposed wind park. The DEIS states that the wind park would likely be built in two or more phases, and that power sale contracts would determine the size and number of turbines per phase, timing of wind park phases, and wind park layout and design (pg. 13). According to the DEIS, testing is not complete and these decisions will be made at a later date. Depending on the rating of the wind turbine generators (WTGs) (1.5 MW to 3.0 MW), the number of WTGs could range from 166 to 333. The extent of impacts on resources is dependent on the size, location, and number of WTGs. Without this type of information, it is difficult, if not impossible, to fully evaluate the impacts of the proposed project on specific resources.

F-4.1

Recommendation:
Provide additional information on the proposed wind park, including the layout and design of the project, within the FEIS so that environmental impacts may be more fully evaluated. If this information is not available, we recommend either not proceeding with publication of the FEIS until it can be included, or evaluating additional alternatives in the FEIS that encompass the full range of potential layouts and sizes and numbers of WTGs.

Alternatives Analysis

The Council on Environmental Quality (CEQ) Regulations for implementing NEPA (40 CFR, Parts 1500-1508) state that the alternatives section of an EIS should "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly describe the reasons for their having been eliminated" (40 CFR, part 1502.14). A robust range of alternatives will identify environmentally sensitive areas or areas with potential use conflicts and include options for avoiding significant environmental impacts.

The CEQ regulations also state that this "includes alternatives not within the jurisdiction of the lead agency" (40 CFR, part 1502.14).

The DEIS presents two action alternatives and a no-action alternative. The Proposed Project includes the wind park (up to 500 MW), 345-kV transmission tie-line, and a 345-kV electrical interconnection switchyard. The second alternative, identified by the Forest Service, identifies an alternate corridor for the transmission tie-line to address potential effects to visual resources, with the wind park and the switchyard located in the same places (pg. 44). According to the DEIS, several alternatives related to the transmission line and switchyard were considered but not carried forward. Alternatives addressing the location of the proposed wind park were not considered since decisions and actions related to the proposed wind park are outside of the scope of decisions that will be made by Western and the Forest Service and no alternative locations were proposed during the EIS scoping process (pg. 51). As previously noted, however, a robust alternatives analysis includes reasonable alternatives not within the jurisdiction of the lead agency (40 CFR, part 1502.14).

F-4.2

Recommendation:
Expand the alternatives analysis in the Final Environmental Impact Statement (FEIS) to include either alternate site locations (to the proposed wind park) or on-site alternatives that demonstrate a reduction of impacts.

Water Resources

Clean Water Act Section 404

EPA is concerned about the potential adverse impact to aquatic resources that may result from the Proposed Project. According to the DEIS, there are numerous named and unnamed drainages and ephemeral streams found in the wind park study area (pg. 131). Under Section 404 of the Clean Water Act (CWA), the U.S. Army Corps of Engineers (Corps) has authority to regulate the discharge of dredged and fill material into waters of the United States (WUS, jurisdictional waters). WUS include non-navigable tributaries that typically flow year-round or have flow at least seasonally (pg. 131). Wetlands, which are special aquatic sites, as well as drainages and ephemeral washes, can also be jurisdictional. Activities resulting in dredging or filling of jurisdictional waters would require authorization under a CWA Section 404 Permit.

According to the DEIS, field review of the water resources evaluation area and a review of National Wetlands Inventory (NWI) maps did not identify wetlands in the vicinity of the proposed project components (pg. 131). As described in the Grapevine Canyon Wind Project Site Characterization Report, however, woody wetlands are present in the Grapevine Canyon Wind Resource Area (GCWRA; 375.11 acres) and the Evaluation Area (524 acres) (Appendix D.1, pg. 10). Based on the NWI data, the GCWRA is includes 30.86 acres of wetland habitat and the Evaluation Area includes of 123.53 acres of wetland habitat (Appendix D.1, pg. 10). Thus, the information presented in the DEIS appears to contradict that which is presented in the Grapevine Canyon Wind Project Site Characterization Report.

2

F-4.3 *Recommendation:*
Clarify whether wetlands are present in the GCWRA and the Evaluation Area.

The DEIS states that, if required, the Applicant would apply for a Nationwide Permit No. 12 for utility line activities administered under Section 404 of the CWA. In addition, potential impacts to WUS or wetlands identified by the Forest Service that result from construction, operation, and maintenance of the proposed wind park and transmission tie-line would be minimized through implementing the Resource Protection Measures (RPMs) listed in Section 2.7 (pg. 131). We note, however, that in the absence of a formal jurisdictional determination verified by the Corps, it is difficult to discern the extent of impacts to waters based on information **F-4.6** provided in the DEIS. EPA is concerned that the impacts to aquatic resources, particularly in the wind park, may be underestimated.

The DEIS states that the primary access road would require a crossing of Canyon Diablo, with an anticipated span of up to 80 feet. In addition to Canyon Diablo, the access road is expected to cross up to five smaller ephemeral washes (pg. 21). Culverts would likely be placed within these washes at crossings. Once primary access has been established, service roads to each wind turbine generator site would be constructed. Up to 143 miles of service roads would be needed if the wind park is fully built out to 500 MW (pg. 21). Proposed project construction associated with access roads and transmission line development could directly affect (via temporary or permanent fill) and indirectly affect drainages and ephemeral washes within the Proposed Project area. The document states that access roads will be designed to incorporate culverts for crossing waters on the project site, but there is no information on the extent of impact. Road crossings within WUS may result in the reduction of the physical extent of waters, adverse modification of stream hydrology and sediment transport, and adverse effects to habitat connectivity and wildlife movement.

If it is determined that there are jurisdictional waters within the project area, a CWA Section 404 permit from the Corps will be necessary for any discharges of dredged or fill material into these waters. If a Section 404 permit is required, EPA will review the project for compliance with the Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials (40 CFR 230), promulgated pursuant to Section 404(b)(1) of the CWA (Guidelines). **F-4.8** Pursuant to the Guidelines, any permitted discharge into WUS must be the Least Environmentally Damaging Practicable Alternative (LEDPA) available to achieve the project purpose. No discharge can be permitted if it will cause or contribute to significant degradation of WUS. Based on the information available within the DEIS, the applicant has not demonstrated compliance with the Guidelines.

If impacts to aquatic resources cannot be avoided, alternatives that minimize impacts must be fully considered. With projects such as transmission lines and wind parks, there are opportunities to avoid and minimize impacts to waters through sensitive design criteria such as the placement of towers/wind turbines out of waters, including drainages and washes, and a reduction of the construction footprint. Additional avoidance and minimization alternatives should be explored, such as bridging and the use of at-grade crossings or Arizona crossings. Pursuant to the Guidelines, the applicant must mitigate for unavoidable impacts to WUS. EPA offers the following recommendations to help facilitate compliance of the project with the Section 404 Guidelines:

Recommendations:

F-4.4
F-4.5
The project Applicant should consult with the Corps to determine if the proposed project requires a Section 404 permit under the CWA, and this information should be disclosed in the FEIS. The results of a jurisdictional delineation by the Corps should also be included in the FEIS.

F-4.7 The FEIS should include a table and clear narrative on the direct, indirect/secondary and temporary impacts to waters, including wetlands. Quantify, in the FEIS, potential impacts to WUS and discuss the steps that would be taken to avoid and minimize impacts. Include a mitigation plan for unavoidable impacts to WUS, as required by Corps **F-4.4** and EPA regulations, and describe how the Proposed Project would meet 404 (b)(1) Guidelines, which require that projects first avoid, then minimize, and, finally, mitigate any impacts to WUS, including wetlands and other special aquatic sites.

F-4.8 Include an evaluation of the project alternatives with regard to compliance with the 404(b)(1) Guidelines and authorization of the LEDPA, if applicable. The location of bald and golden eagle home ranges and migration corridors in the vicinity of the project, as well as the need to avoid the take of eagles, should be considered during development of the LEDPA.

F-4.6 Characterize the functions of any aquatic features that could be affected by the project that are determined not to constitute WUS, and discuss potential mitigation.

Ephemeral Washes

The FEIS should include additional detailed information on the functions and locations of ephemeral washes. Natural ephemeral washes perform a diversity of hydrologic and biogeochemical functions that directly affect the integrity and functional condition of higher-order waters downstream. Healthy ephemeral waters with characteristic plant communities control rates of sediment deposition and dissipate the energy associated with flood flows. Ephemeral washes also provide habitat for breeding, shelter, foraging, and movement of wildlife. Many plant populations are dependent on these aquatic ecosystems and adapted to their unique **F-4.10** conditions. Potential damage that could result from disturbance of flat-bottomed washes includes alterations to the hydrological functions that natural channels provide in arid ecosystems: adequate capacity for flood control, energy dissipation, and sediment movement, as well as impacts to valuable habitat for desert species.

Recommendations:

F-4.9 Provide, in the FEIS, additional information on the functions and locations of ephemeral washes in the project area and their hydrologic and biogeochemical roles in relationship to higher-order waters downstream.

F-4.10 Minimize ground disturbance, thus reducing impacts to species habitat and fill of ephemeral washes.

Threatened, Endangered, and Sensitive Wildlife Species

EPA is concerned about potential impacts to sensitive wildlife species, particularly avian and bat species. The wind park lies within the Intermountain West region of the American Pacific Flyway, one of five primary migratory routes for waterbirds, shorebirds, songbirds, and raptors (pg. 94). According to the DEIS, seventeen diurnal raptor species and eight owl species have the potential to occur within the biological resources evaluation area (pg. 94). In addition, thirty species of bat are known to occur in Arizona, with 20 species having an approximate range that includes the project area (pg. 95). The most likely roosting habitat for bats is within canyons, caves, crevices, and rock outcrops, features that are present in the wind park project area. During baseline studies conducted at a subsection of the proposed wind park (Study Area A), ten raptor species were observed using the area, including the bald eagle and golden eagle. In addition, two inactive golden eagle nests were observed within Grapevine Canyon (pg. 94).

As noted in the DEIS, all raptor and owl species are protected under the Migratory Bird Treaty Act (MBTA). The golden eagle and bald eagle also receive protection under the Bald and Golden Eagle Protection Act (BGEPA). In September 2009, the U.S. Fish and Wildlife Service **F-4.12** (FWS) finalized permit regulations[1] under the BGEPA for the take of bald and golden eagles on a limited basis, provided that the take is compatible with preservation of the eagle and cannot be practicably avoided. The final rule states that if advanced conservation practices (ACPs) can be developed to significantly reduce take, the operator of a wind-power facility may qualify for a programmatic take permit. Most permits under the new regulations would authorize *disturbance*, rather than take.[2] Given the large home ranges of golden eagles and proximity of nests in the area, some birds are likely to be killed during operations even with protective measures. According to the DEIS, a regression analysis was used to predict raptor mortality at Study Area A. The analysis results predict an estimated fatality rate of 10 raptors per year per 100 MW of wind energy (pg. 102) or up to 50 raptors per year at full build out (500 MW). The DEIS does not adequately address the acquisition of permits associated with disturbance or take of bald and golden eagles.

Recommendations:

F-4.11 Identify, in the FEIS, specific measures to reduce impacts to eagles. Clarify how the proposed project will comply with the MBTA and BGEPA.

F-4.12 Discuss in the FEIS the applicability of the recently finalized FWS permit regulations (50 CFR Parts 13 and 22) to the proposed project. Elaborate on the process and likelihood of obtaining a permit via these regulations.

[1] See Eagle Permits, 50 CFR parts 13 and 22, issued Sept. 11, 2009. See internet address: http://www.fws.gov/migratorybirds/CurrentBirdIssues/BaldEagle/Final%20Disturbance%20Rule%209%20Sept%20 2009.pdf

[2] See U.S. Fish Wildlife Service Migratory Bird Management Information: Eagle Rule Questions and Answers. http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/QAs%20for%20Eagle%20Rule.final .10.6.09.pdf

F-4.13 Commit, in the FEIS and Record of Decision (ROD), to additional data collection and analysis to identify areas that are important to bald and golden eagles to ensure proper siting and avoid take of these species.

F-4.19 If alternatives cannot be developed that avoid the take of eagles, develop an operational monitoring and adaptive management plan to address this issue, and include it in the FEIS and ROD.

Table 2.7-1 summarizes the RPMs that would be applied to the proposed project components. The RPMs state that additional bird and bat data collection *may* occur for portions of the wind park study area not already surveyed (pg. 56). Baseline biological studies were conducted at Study Area A (subsection of the proposed wind park) in 2007 and 2008, but have not been conducted over the rest of the wind park. In addition, after the wind park begins operation, the Applicant would conduct a formal post-construction monitoring study (1 year) designed to estimate avian and bat mortality (pg. 56). If the first year's monitoring suggests an extraordinary fatality rate, or where weather conditions are highly variable to affect migration timing and testing, additional post-construction monitoring would occur. The RPMs state that an Avian and Bat Protection Plan would be developed prior to wind park construction to help ensure the wind park is operated in an environmentally sustainable manner to minimize potential impacts to birds, bats, and other wildlife and their habitat (pg. 56).

The US Fish and Wildlife Service recently published a set of guidelines and recommendations[3] on how to avoid and minimize impacts of land-based wind farms on wildlife and habitat (March 2010). The document was prepared by the Wind Turbine Guidelines Advisory Committee and contains both policy recommendations and recommended voluntary guidelines for siting and operating wind energy projects in order to avoid or minimize potential impacts to wildlife and habitat. The Committee's Guidelines utilize a "tiered approach" to assess potential impacts to wildlife and their habitats. The five tiers include: 1) preliminary evaluation or screening of sites; 2) site characterization; 3) field studies to document site wildlife conditions and predict project impacts; 4) post-construction fatality studies; and 5) other post-construction studies. The Guidelines provide a consistent methodology for conducting pre-construction risk assessments and post-construction impact assessments to guide siting decisions by developers and agencies. Furthermore, the Guidelines address all elements of a wind energy facility, including the turbine string or array, access roads, ancillary buildings, and the above-and below-ground electrical lines which connect a project to the transmission system.

Recommendations:

F-4.14 Conduct additional pre-construction surveys of raptors and bats prior to siting turbines, including those areas not previously surveyed in 2007 and 2008 (Study Areas B and C).

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[3] U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee Recommendations, submitted to the Secretary of the Interior by the U.S. Fish and Wildlife Service, March 4, 2010. See Internet address: http://www.fws.gov/habitatconservation/windpower/Wind_Turbine_Guidelines_Advisory_Committee_Recommendations_Secretary.pdf

F-4.15 Commit to post-construction monitoring studies as described by the Wind Turbine Guidelines Advisory Committee. We strongly recommend that post-construction monitoring be conducted for at least two years.

Complete biological surveys for Study Areas B & C prior to construction in Study Area A.

Consider whether it would be prudent to conduct raptor studies over a broader area than Study Areas A, B, & C (wind park). Some raptor studies in California have extended up to 10 miles beyond the project boundary for a renewable energy project.

F-4.16 EPA encourages Western and the Applicant to include in the FEIS a commitment to reduce impacts to migratory birds and eagles. We encourage Western and the Applicant to relocate, reduce, or eliminate portions of the project footprint that would adversely affect threatened, endangered, or sensitive species or their potential habitat. Additional actions that should be considered are discussed below.

F-4.16

Recommendations:
Minimize placement of wind turbines near prairie dog towns within the proposed project area.

Consider a tactical shut down option during critical hours of species activity, as appropriate, to minimize adverse impacts on such species.

Consider blade feathering/idling (including on-the-spot and seasonal shutdowns), reducing cut-in speeds, and adjusting turbine speeds during strategic intervals to reduce take and to prevent mortality.

Consider utilizing unique types of radar technology to monitor for bird and bats. [4]

Implement and use design models that present the least threat to all wildlife for all transmission and distribution lines, as well as associated infrastructure at substations/switchyards.

The DEIS states that a Biological Assessment is being prepared under Section 7 of the Endangered Species Act (ESA) for federally listed species (pg. 180). Should it be determined that the proposed Federal actions would adversely affect federally listed species, Western will request a Biological Opinion from the U.S. Fish and Wildlife Service.

F-4.17

Recommendation:
EPA recommends Western include the Biological Assessment and the outcome of its consultation with the U.S. Fish and Wildlife Service in the FEIS.

[4] For example, see http://www.detect-inc.com/avian.html and http://www.upi.com/Science_News/Resource-Wars/2010/03/18/Radar-reduces-wind-farm-risk-to-birds/UPI-71441268920323/. These resources are provided as examples only and do not constitute endorsement of any particular product by EPA.

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According to the DEIS, any avian and bat mortalities caused by the operation of the wind park would be an unavoidable adverse impact, and would be addressed pursuant to its Avian and Bat Protection Plan.

F-4.18 *Recommendation:*
Include a copy of the Avian and Bat Protection Plan within the FEIS.

Implementation of Adaptive Management Techniques for Mitigation Measures

Adaptive management is an iterative process that requires selecting and implementing management actions, monitoring, comparing results with management and project objectives, and using feedback to make future management decisions. The process recognizes the importance of continually improving management techniques through flexibility and adaptation instead of adhering rigidly to a standard set of management actions. For adaptive management to succeed, there must be agreement to adjust management and/or mitigation measures if monitoring indicates that goals are not being met. Although adaptive management is not a new concept, it may be relatively new in its application to specific projects. As stated in a recent CEQ report, *Modernizing NEPA*, the effectiveness of adaptive management monitoring depends on a variety of factors including:

a) The ability to establish clear monitoring objectives;
b) Agreement on the impact thresholds being monitored;
c) The existence of a baseline or the ability to develop a baseline for the resources being monitored.
d) The ability to see the effects within an appropriate time frame after the action is taken;
e) The technical capabilities of the procedures and equipment used to identify and measure changes in the affected resources and the ability to analyze the changes;
f) The resources needed to perform the monitoring and respond to the results.

F-4.19 *Recommendations*:
EPA recommends that the Applicant consider adopting a formal Adaptive Management Plan to ensure the success of mitigation measures and to provide management flexibility to incorporate new research and information.

EPA recommends that the Adaptive Management Plan include a timeline for periodic reviews and adjustments, as well as a mechanism to consider and implement additional mitigation measures, as necessary, after the project is developed. Monitoring and evaluation should be used to determine if management actions are achieving objectives.

F-4.19 EPA recommends that Western, the Forest Service, and the Applicant review the specific discussion on Adaptive Management in the NEPA Task Force Report to the Council on Environmental Quality on *Modernizing NEPA*.

Air Quality

The DEIS provides standards of significance for air quality impacts and states that impacts would be greatest during the construction period (pg. 123). Air quality impacts would include emissions from internal combustion engines during equipment operation, fugitive dust from vehicle travel and site grading activities, and operation of a rock crushing plant and concrete batch plant. According to the DEIS, the batch plants proposed for use would emit less than 250 ton/year (tpy) of any criteria pollutant and would not require a major source permit, but rather a minor source permit from the Arizona Department of Environmental Quality (ADEQ). Operational impacts would be restricted to dust and internal combustion engine emissions due to periodic maintenance vehicle traffic. The DEIS indicates that, with implementation of the mitigation, construction activities and vehicle and equipment emissions are not expected to violate air quality standards, and air quality significance thresholds would not be exceeded (pg. 123; pg. 124). EPA is concerned that the DEIS does not provide estimates for construction emissions and vehicle and equipment emissions, as well as estimated mitigated annual emissions. In order to support the conclusions presented in the DEIS that standards and thresholds will not be exceeded, we request that the FEIS provide a more robust analysis of the emissions from the proposed project.

The DEIS states that there are currently no sources of electricity within the wind park study area. A temporary source of electricity would be required for construction. Two options are under consideration: 1) on-site generation, or 2) extending an electrical distribution line along Meteor Crater Road (pg. vi). Should the Applicant select on-site generation, these emissions should be accounted for in the air quality analysis.

F-4.20

Recommendation:
The FEIS should contain a more robust analysis of emissions from construction, vehicle use, and equipment use, including estimated mitigated annual emissions. Emissions associated with on-site generation of electricity during construction should be included in this analysis.

EPA supports incorporating mitigation strategies to minimize fugitive dust emissions, as well as emission controls for particulate matter (PM) and ozone precursors for construction-related activity. All applicable State and local requirements and the additional and/or revised measures listed below should be included in the FEIS in order to reduce impacts associated with ozone precursors, PM, and toxic emissions from construction-related activities.

Recommendations:
EPA recommends that best management practices, all applicable requirements under local or State rules, and the following additional measures be implemented at all times and incorporated into the FEIS, a Construction Emissions Mitigation Plan, and the Record of Decision.

F-4.21

<u>Fugitive Dust Source Controls</u>:

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both

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inactive and active sites, during workdays, weekends, holidays, and windy conditions.

- Install wind fencing, and phase grading operations, where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage, and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

F-4.21

<u>Mobile and Stationary Source Controls</u>:

- Reduce use, trips, and unnecessary idling of heavy equipment.
- Maintain and tune engines per manufacturer's specifications to perform EPA certification levels, where applicable, and to perform at verified standards applicable to retrofit technologies. Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications.
- Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations
- If practicable, lease new, clean equipment meeting the most stringent of applicable Federal or State Standards.
- Utilize EPA-registered particulate traps and other appropriate controls where suitable, to reduce emissions of diesel particulate matter and other pollutants at the construction site.
- Limit vehicle speeds on unpaved roads to 15 mph.

<u>Administrative controls</u>:

- Identify all commitments to reduce construction emissions and incorporate these reductions into the air quality analysis to reflect additional air quality improvements that would result from adopting specific air quality measures.
- Identify where implementation of mitigation measures is deemed to be not implementable due to economic infeasibility and provide comparable determinations for other similar projects as justification for this decision.
- Prepare an inventory of all equipment prior to construction, and identify the suitability of add-on emission controls for each piece of equipment before groundbreaking. (Suitability of control devices is based on: whether there is reduced normal availability of the construction equipment due to increased downtime and/or power output, whether there may be significant damage caused to the construction equipment engine, or whether there may be a significant risk to nearby workers or the public.)
- Meet EPA diesel fuel requirement for off-road and on-highway (i.e., 15 ppm), and where appropriate use alternative fuels such as natural gas and electric.
- Develop construction traffic and parking management plan that minimizes traffic interference and maintains traffic flow.
- Identify sensitive receptors in the project area, such as children, elderly, and infirm, and specify the means by which you will minimize impacts to these populations. For example, locate construction equipment and staging zones away from sensitive receptors and fresh air intakes to buildings and air conditioners.

Climate Change

The DEIS presents a brief discussion on greenhouse gas emissions in Arizona in Section 3.5.1.2, Climate Change/Greenhouse Gas (pg. 122). Operation of the wind park would have a net benefit to air quality, as wind energy produces no air emissions (pg. 125). The DEIS does not, however, include measures to avoid, minimize, or mitigate the effects of climate change on the proposed project, nor does it discuss the extent to which climate change may alter the impacts of the proposed project on the environment. Scientific evidence supports the concern that continued increases in greenhouse gas emissions resulting from human activities will contribute to climate change. Effects on weather patterns, sea level, ocean acidification, chemical reaction rates, and precipitation rates can be expected. These changes may affect the scope and intensity of impacts resulting from the proposed project.

F-4.22

Recommendations:
Consider how climate change could affect the proposed project, specifically within sensitive areas, and assess how the impacts of the proposed project could be exacerbated by climate change.

Identify strategies to more effectively monitor for climate change impacts in the surrounding area, such as monitoring for groundwater change and effects on special status species.

Identify specific mitigation measures needed to protect the Proposed Project from the effects of climate change.

Quantify and disclose the anticipated climate change *benefits* of wind energy. We suggest quantifying the greenhouse gas emissions that would be produced by other types of electric generating facilities (solar, geothermal, natural gas, coal-burning, and nuclear) generating comparable amounts of electricity, and compiling and comparing these values.

Cultural Resources, National Historic Resources and Consultation with Tribal Governments

Consultation for tribal cultural resources is required under Section 106 of the National Historic Preservation Act (NHPA). Historic properties under the NHPA are properties that are included in the National Register of Historic Places (NRHP) or that meet the criteria for the National Register. Section 106 of the NHPA requires a federal agency, upon determining that activities under its control could affect historic properties, to consult with the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO).

Executive Order 13007, Indian Sacred Sites (May 24, 1996), requires federal land managing agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian Religious practitioners, and to avoid adversely affecting the physical integrity, accessibility, or use of sacred sites. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000), was issued in order to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, and to strengthen the United States' government-to-government relationships with Indian tribes. President Obama directed all federal agencies to develop an action plan to implement this Executive Order by February 3, 2010. For more information, refer to: http://www.whitehouse.gov/the-press-office/memorandum-tribal-consultation-signed-president.

The DEIS states that Western has initiated consultation with the Hopi and Zuni Tribes and the Navajo Nation. The DEIS indicates that research identified 678 previously recorded cultural resources within the cultural resources evaluation area. Twenty-four of these sites potentially occur within 100 feet of the wind park study area, tie-line, and/or switchyard. Of the 24 sites, four are recommended as eligible for listing in the NRHP. According to the DEIS, a draft Programmatic Agreement (PA) among Western, Coconino National Forest, Arizona State Lands Division, Arizona SHPO, the Applicant, Tribes and other interested parties has been prepared and is currently under review. The PA establishes the area of potential effect for the proposed project, proposes a treatment plan for identified resources that cannot be avoided, describes procedures for unanticipated discoveries, sets forth procedures for tribal consultation, and suggests general mitigation measures (pg. 112).

F-4.23

Recommendations:
Describe the process and outcome of government-to-government consultation between Western and each of the tribal governments within the project area, issues that were raised (if any), and how those issues were addressed in relation to the proposed action and selection of a preferred alternative.

Include a copy of the PA within the FEIS, if available.

Cumulative Impacts Analysis

The DEIS presents a summary of past, present, and reasonably foreseeable future actions including the Sunshine Wind Project (table 4.2-1).

F-4.24

Recommendation:
Provide an illustration of the location of the Sunshine Wind Project.

Project Decommissioning

The life of the proposed wind park is expected to be 25 years or more. The wind park owner may elect to renew the land leases at the end of the contracted agreements depending on power market conditions and future contracts for sale of electricity (pg. 183). The WTGs may also be updated with more efficient components, extending the life of the wind park. According to the DEIS, the wind park owner would have the obligation to decommission the facility and perform reclamation as required by the landowners and appropriate land management agencies or jurisdictional authorities.

F-4.25 *Recommendations:*
EPA recommends that the FEIS identify bonding or financial assurance strategies for decommissioning and reclamation. The projected 25-year lifespan should be used to ascertain the correct financial instruments that could be used for bond and or financial assurance calculations.

The FEIS should take into consideration the increased cost (projected future rates) of decommissioning in 25 years and make provisions for extended or refurbished use.

Comments from the Arizona Wildlife Federation on the Grapevine Canyon Wind project, September 2010

Pronghorn

O-1.1

A timing restriction on construction within summer pronghorn habitat, particularly the transmission line, should be implemented during the fawning season (April 15 – May 31) to mitigate potential impacts to pronghorn during this critical period.

Rationale:

The tie-line, switchyard, and the wind park study area fall within the range of the Anderson Mesa herd of pronghorn antelope. This population declined throughout recent decades as a result of habitat degradation and drought (AGFD 2007b; Forest Service 2002). Volume I page 96

The primary management issue for the Anderson Mesa pronghorn herd is low fawn recruitment (AZGFD 2007). EIS Volume II appendix D Page 57

Approximately 63.2% of the Transmission Line is comprised of grassland habitat and pronghorn antelope likely occur in these areas, particularly during the summer breeding season. EIS Volume II Wildlife and Botanical Report page 44

Construction may also result in short-term changes in pronghorn movement or behavior if pronghorn occur in the project area during construction EIS page 105.

The Coconino National Forest institutes annual road closures on Anderson Mesa to reduce disturbance impacts to pronghorn fawning. The EIS acknowledges that construction could result in short term changes in pronghorn movement or behavior if pronghorn occur in the project area during construction. Based on the high percentage of grassland habitat, known antelope use in this area of Anderson Mesa, and concern for fawn recruitment for this herd, it seems mitigation of any potential disturbance to pronghorn fawning is warranted

Wetlands and Riparian Areas

O-1.2

Wetlands and riparian areas are extremely important and limited habitat types. The EIS should disclose if these areas will be impacted. These areas should be located and any potential impacts disclosed for consideration prior to a final decision on the project.

Page 87 of the EIS states: *Wetland delineations have not been performed at this time but would be completed prior to project construction within areas subject to permanent and temporary disturbance.*

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September 7, 2010

Mr. Matt Blevins
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228
Submitted via email to GrapevineWindEIS@wapa.gov

Dear Mr. Blevins:

Please accept these comments on the Grapevine Canyon Wind Project on behalf of the Sierra Club's Grand Canyon Chapter and our 12,000 members in Arizona.

The Sierra Club is the nation's oldest and largest grassroots conservation organization, founded in 1892 and having more than 1.3 million members and supporters nationwide, including more than 12,000 in the Grand Canyon (Arizona) Chapter. The Sierra Club's mission is "to explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; and to educate and enlist humanity to protect and restore the quality of the natural and human environments." The Sierra Club has been involved for many years in working to protect Arizona's public lands, wildlife, air and water. The Sierra Club is also very interested and involved in promoting renewable energy and energy efficiency as a means to reduce greenhouse gas emissions and help limit global climate change. We strongly believe that properly sited renewable energy resources are part of the solution to this most challenging issue.

General Comments and Background

It is clear that energy generated with fossil fuels has serious impacts to our wildlands – from mining and drilling associated with accessing it to the greenhouse gas emissions from burning the fuels and the impacts of global climate change. Our nation must transition to clean renewable energy sources in order to sustain both our human and wildland communities. Some public lands harbor substantial wind, solar, and geothermal resources. Developing some of these resources will be important to creating a sustainable energy economy and combating climate change. Renewable resource development is not appropriate everywhere on the public lands, however, and any development that does occur on the public lands must take place in a responsible manner. Whenever possible, we think it is most appropriate to seek disturbed sites for these types of projects.

The National Environmental Policy Act (NEPA) and the regulations promulgated to implement the act (42 U.S.C. § 4321, *et seq*., 40 CFR § 1500.1, *et seq.*) mandate that the Western Area Power Administration (Western) assess and evaluate the environmental impacts of the **Grapevine Canyon Wind Project** and that reasonable alternatives be considered (42 U.S.C. § 4332 102 C). Western, as the lead agency for this project, must consider cumulative impacts as well as direct and indirect impacts of the proposed wind project (40 CFR ~ 1508.7). The project area includes a wind generating facility that is located on private and state trust lands, which may be built in two or more phases; a 200 foot right-of-way across Forest Service lands in order to construct and operate a 345 kV electric transmission tie-line; an access road; and an interconnection switchyard on 15 acres of Forest Service land.

There will be a temporary land disturbance of 2,419-2,630 acres of land and permanent disturbance and removal of vegetation from 591-627 acres of land. The project will include either 333 1.5-MW wind turbine generators, 277 1.8-MW wind turbine generators, or 166 3.0-MW wind turbine generators, any of which will have a substantial impact on the area and surrounding public lands.

Large-scale wind turbine groupings, often called wind farms, such as the proposed Grapevine Canyon Wind Project, can have significant impacts on populations of plants as well as on birds, bats and other species. How, where and when equipment is sited and operated can help minimize these impacts.

The most publicized impacts of operating large-scale wind turbines are to birds and bats through collision with moving turbines, which leads to almost certain mortality. There is also some evidence that bats are affected by barotrauma (rapid pressure change that causes tissue damage or pulmonary hemorrhage) related to the change in air pressure near the moving turbine blades. Other species, including small mammals and plants, may be affected by ground disturbance, during migration, and from other impacts of construction and operation.

O-2.1 While the DEIS proposes some limited mitigation and Resource Protection Measures (RPMs) for the proposed project, they are limited to proposed switchyard and tie-line. We believe this scope is too narrow as the project is clearly dependent on utilizing the public's lands and the public's transmission lines. The impacts of the overall project should be considered and mitigation included.

Wildlife

One of the greatest concerns regarding a project of this magnitude is the potentially significant negative impacts on wildlife. As noted above and in the Draft Environmental Impact Statement (DEIS), the most **O-2.2** significant impacts of wind turbine operation are bird and bat mortalities. Thorough surveys of birds, mammals, plants and other wildlife are an essential first step in avoiding and minimizing impacts. This includes surveys in all seasons to capture migration periods and fluctuations in population depending on the season. Surveys should be done at night as well as during daylight as migration, particularly of birds, often happens at night. Since less is known about affected species such as bats, monitoring is very important to determine the baseline presence of bat species.

Per the DEIS, several bat species utilize the project area, so monitoring there is important.

While much has been said about improvements to turbine design to reduce bird and bat mortality, the rates of mortality appear not to change significantly with different designs. However, research over the **O-2.3** past two decades has pointed to a number of siting and operational options that can greatly reduce wildlife impacts based upon where turbines are sited and when they operate.

- Monitor before and during construction and operation to identify and minimize bird and bat mortality. Studies[1] suggest that frequent surveying of footprint areas for dead birds and bats is

[1] Arnett, E. B., technical editor. 2005. Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of bat fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

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O-2.3 important as they may quickly disappear due to scavengers. Monitoring should include a baseline analysis of the nocturnal migration of songbirds as well as any detected bat migration.

O-2.4
- Avoid raptor concentration areas: Much has been written about the high raptor mortality at Altamont Pass in northern California. By avoiding raptor nesting and migration corridors, raptor fatalities can be minimized. Through wildlife surveys, scientists can also identify where raptors spend their time searching for prey, and these areas can then be avoided for turbine placement.

O-2.5
- Avoid canyons, passes and other migration pathways: Valleys, swales and low passes have been found to be used most by migrating birds and should also be avoided.

O-2.6
- Require setbacks from windward rims: Various studies have shown high use by raptors of rim edge habitats. Required setbacks of 100 meters for turbines can help reduce loss of raptors.

O-2.7
- Site turbines in open habitats at least one mile from woodland areas in order to reduce the likelihood of bat mortality. The main bat species known to be affected by wind turbines are woodland species. It is particularly important to completely avoid any old growth forest areas.

O-2.8
- Shut down turbines in late summer and early fall when bats are migrating and mortalities are highest.[2]

O-2.9
- Require a minimum “cut-in” speed of six meters per second to avoid bat mortalities at slow turbine speeds. There is a correlation between bat mortality and turbine operation during light wind speed.[3]

O-2.10
- Study the impacts of wind energy facilities on large ungulates before construction in any of these areas. Not enough is known about the tolerance for wind energy facilities by large ungulates including elk, deer and pronghorn or the impacts on crucial habitats as well as migratory corridors.

O-2.11
- Construct wind facilities in a season when animals are not migrating in areas where these facilities intersect with critical ranges or migration corridors of large mammals.

O-2.12
- Close turbine areas to vehicles and human use during the period of habitation by sensitive species of wildlife.

O-2.13 Larger mammals, including elk, deer and pronghorn, can be affected by long rows of turbines along migration routes or in calving areas. In addition, pronghorn, elk and, to some extent, mule deer avoid areas with roads or other human development. This site includes some pronghorn, elk, and mule deer habitat, so there are likely to be some negative impacts on these species and mitigation of those impacts should be considered.

O-2.14 Because the potential impacts to wildlife are so significant, we ask that *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona*[4], developed by the Arizona Game and Fish

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[2] Behavioral Responses of Bats to Operating Wind Turbines, Horn, Jason W. et al. Journal of Wildlife Management 72(1):123–132; 2008)
[3] *Id.*
[4] Arizona Game and Fish Department. 2008. *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona.*

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O-2.14 Department, be utilized for ensuring wildlife-friendly alternatives and be considered as part of the Final Environmental Impact Statement.

Bats

According to the DEIS, 11 species of bats have been recovered in carcass surveys at wind facilities in the U.S. and five out of those 11 species are migrants or potential residents in the Grapevine Canyon Wind Resource Area. They include hoary bat (*Lasiurus cinereus*), silver-haired bat *(Lasionycteris noctivagans)*, Mexican free-tailed bat (*Tadarida brasiliensis mexicanus*), big brown bat(*Eptesicus fuscus)*, and western red bat *(Lasirurs blossevillii)*. There are also 20 species of bats total that may occur in this project area. Both the spotted bat and western red bat are listed as species of concern.

According to the U.S. Geological Survey, dead bats have been found around wind turbines in locations throughout the world and in nearly every site in North America.[5] There are still a lot of unanswered questions as to why, but there is information available that can be useful in siting the projects, evaluating the projects, determining operation of the projects, and mitigating impacts.

Two species of migratory tree bats, the hoary and silver-haired bat, appear to account for 75% or more of wind power related bat mortality in the West. They are primarily associated with woodland areas and use trees for roosts, so turbines should be located at least one mile from these woodlands in order to minimize bat mortality. The reason for mortality is still under study, but most of it occurs during late summer and fall, which coincides with their main migratory period. As these bats have been found in the project area, special care should be taken relative to these species, and mitigation measures to reduce mortality of the bats should be included in the project design.

Studies of bat fatalities indicate that weather patterns have an effect – most bats are killed on nights with lower wind speeds. More bats were killed before and after storm fronts passed through as well.[6] This means some operational changes can also minimize bat mortalities. Requiring minimum "cut-in" speeds of approximately six meters per second can help avoid bat mortalities at slow turbine speeds.[7,8] Shutting down turbines in late summer and early fall when bats are migrating and mortalities are highest can also help to minimize bat mortalities associated with the turbines.

Birds

Birds suffering mortality from moving wind turbine blades include raptors, songbirds (passerines) and others. Bird mortality has been severe at some locations, but changes to location and operation of turbines may reduce the toll. As noted above, monitoring before and during construction and operation to identify and minimize bird mortality is critical. Monitoring should include a baseline analysis of the nocturnal migration of songbirds.

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[5] Bat Fatalities at Wind Turbines: Investigating the Causes and Consequences *available at* http://www.mesc.usgs.gov/BatsWindmills/ (last visited 12/30/2009)
[6] Arnett, Edward B., et al, January 2008. Patterns of Bat Fatalities at Wind Energy Facilities in North America, *Journal of Wildlife Management* 72(1):61-78. 2008.

.[7] Baerwald, E.F., J. Edworthy, M. Holder, and R.M.R. Barclay. 2009. A large-scale mitigation experiment to reduce bat fatalities at wind energy facilities. Journal of Wildlife Management 73(7): 1077–1081
[8] Arnett, E.B., M. Schirmacher, M.M.P. Huso, J.P. Hayes. 2009. Effectiveness of changing wind turbine cut-in speed to reduce bat fatalities at wind facilities. An annual report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

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The turbines should be located away from any raptor concentration areas and at least 100 meters from any windward rims to minimize raptor loss.[9] Likewise, canyons, passes and any other migration paths should be avoided. Raptors are especially susceptible to mortality associated with wind turbines as they are more apt to collide with the turbines than some other birds. Much has been written about the high raptor mortality at Altamont Pass in northern California[10] as well as at Tehachapi Pass.[11] By avoiding raptor nesting and migration corridors, raptor fatalities can be minimized. Through wildlife surveys, scientists can also identify where raptors spend their time searching for prey, and these areas can then be avoided for turbine placement.

According to the DEIS, seventeen diurnal raptor species have potential to occur in the project area and 10 species were observed during the baseline surveys. Eight have the potential to nest or reside year-round within the evaluation area including the sharpshinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), northern goshawk, red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), bald eagle, American kestrel (*Falco sparverius*), and prairie falcon (*Falcon mexicanus*). Eight species of owls also occur in the area.

Pronghorn

O-2.15 Of particular concern is the impact of this project on the pronghorn on Anderson Mesa. There has been considerable controversy to date regarding the decline of this herd and the impacts of livestock grazing. The numbers have significantly dwindled. Pronghorn are especially sensitive to roads and fences. This project includes construction of a transmission line through Anderson Mesa and the heart of some pronghorn habitat. The construction basically entails building a road under the lines.

O-2.16 Roads and motorized uses have serious detrimental effects on habitats and wildlife.[12,13,14] These effects include direct, indirect and cumulative impacts, ranging from mortality from collisions with vehicles, modification of animal behaviors, altered use of habitats, facilitation of the spread of exotic, invasive and parasitic species, adverse genetic effects and fragmentation of connected habitats. These impacts are not limited to paved route networks. Cole states that "off-road vehicle impacts are particularly serious and difficult to manage. Off-road vehicle (ORV) impacts are particularly troublesome because impact potential is so high."[15]

Vegetation and Invasive Plants

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[10] Thelander, C.G., S. Smallwood, and L. Rugge. 2003. Avian risk behavior and fatalities at the Altamont Wind Resource Area - March 1998 to December 2000. Progress Report to the National Renewable Energy Laboratory, Subcontract No. TAT-8-182209-01. K. Sinclair, Technical Monitor.
[11] Anderson, R., N. Neumann, and J. Tom. September 2004. Avian Monitoring and Risk Assessment at the Tehachapi Pass Wind Resource Area, National Renewable Energy Laboratory Subcontractor Report.
[12] Trombulak , S.C. and C.A. Frissell. 2000. Review of ecological effects of roads on terrestrial and aquatic communities. Conservation Biology 14: 18-30.
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[14] van Riper, C. III., and R. Ockenfels. 1998. The influence of transportation corridors on the movement of pronghorn antelope over a fragmented landscape in northern Arizona. Proceedings International Conference on Wildlife Ecology and Transportation (ICOWET).
[15] Cole, D.N. 1986. Resource impacts caused by recreation. A literature review for the President's Commission on Americans Outdoors, INT4901, Publication #165, 12 pp. Available online at http://www.fs.fed.us/rm/pubs_other/rmrs_1986_cole_d001.pdf.

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O-2.17 We appreciate that the DEIS outlines the need to minimize soil disturbance and limit opportunities for the spread of invasive plant species. We strongly support measures to revegetate with native endemic species. We encourage consideration of these measures for the overall project.

Summary
Again, we want to reiterate our support for clean renewable energy sources such as wind. We do think it is critical that these facilities be properly sited and conflicts with wildlife and overall environmental

O-2.18 impacts minimized and mitigated, where possible. We encourage a broader consideration of the overall impacts of this project due to the fact that the public lands and transmission are integral components of it moving forward. Consideration of minimizing the impacts on the state and private lands and any mitigation should be included.

Thank you for considering our comments.

Sincerely,

Sandy Bahr
Chapter Director
Sierra Club – Grand Canyon Chapter

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ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Janice K. Brewer
Governor

Benjamin H. Grumbles
Director

August 11, 2010

Mr. Matt Blevins, NEPA Document Manager
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228-8213

Re: Coconino County: Grapevine Canyon Wind Project Draft Environmental Impact Statement

Dear Mr. Blevins:

S-1.1 The Air Quality Division has reviewed your letter, dated July 20, 2010, that was submitted to ADEQ for comments. The proposed Grapevine Canyon Wind Project, as described, is located in an attainment area for 10-micron particulate matter (PM10) and other air pollutants, and is likely to have a de minimis impact on air pollution. Nevertheless, considering the area location, prevailing winds, and to comply with other applicable air pollution control requirements and minimize adverse impacts on public health and welfare, the following information is provided:

REDUCE DISTURBANCE of PARTICULATE MATTER during CONSTRUCTION

This action, plan or activity may temporarily increase ambient particulate matter (dust) levels. Particulate matter 10 microns in size and smaller can penetrate the lungs of human beings and animals and is subject to a National Ambient Air Quality Standard (NAAQS) to protect public health and welfare. Particulate matter 2.5 microns in size and smaller is difficult for lungs to expel and has been linked to increases in death rates; heart attacks by disturbing heart rhythms and increasing plaque and clotting; respiratory infections; asthma attacks and cardiopulmonary obstructive disease (COPD) aggravation. It is also subject to a NAAQS.

The following measures are recommended to reduce disturbance of particulate matter, including emissions caused by strong winds as well as machinery and trucks tracking soil off the construction site:

S-1.2

I. Site Preparation and Construction
   A. Minimize land disturbance;
   B. Suppress dust on traveled paths which are not paved through wetting, use of watering trucks, chemical dust suppressants, or other reasonable precautions to prevent dust entering ambient air
   C. Cover trucks when hauling soil;

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Matt Blevins
August 11, 2010
Page 2of 2

S-1.2
- D. Minimize soil track-out by washing or cleaning truck wheels before leaving construction site;
- E. Stabilize the surface of soil piles; and
- F. Create windbreaks

S-1.3
II. Site Restoration
- A. Revegetate any disturbed land not used;
- B. Remove unused material; and
- C. Remove soil piles via covered trucks.

The following rules applicable to reducing dust during construction, demolition and earth moving activities are enclosed:

- Arizona Administrative Code R18-2-604 through -607
- Arizona Administrative Code R18-2-804
- Pinal County Code Chapter 4

Should you have further questions, please do not hesitate to call Bonnie Cockrell at (602) 771-2378 or Dave Biddle at (602) 771-2376 of the Planning Section Staff.

Very truly yours,

Diane L. Arnst

Diane L. Arnst, Manager
Air Quality Planning Section

Enclosures

cc: Bret Parke, EV Administrative Counsel
David A. Biddle, Environmental Program Specialist
File No. 241843

c. If the burning would occur at a solid waste facility in violation of 40 CFR 258.24 and the Director has not issued a variance under A.R.S. § 49-763.01.

E. Open outdoor fires of dangerous material. A fire set for the disposal of a dangerous material is allowed by the provisions of this Section, when the material is too dangerous to store and transport, and the Director has issued a permit for the fire. A permit issued under this subsection shall contain all provisions in subsection (D)(3) except for subsections (D)(3)(e) and (D)(3)(f). The Director shall permit fires for the disposal of dangerous materials only when no safe alternative method of disposal exists, and burning the materials does not result in the emission of hazardous or toxic substances either directly or as a product of combustion in amounts that will endanger health or safety.

F. Open outdoor fires of household waste. An open outdoor fire for the disposal of household waste is allowed by provisions of this Section when permitted in writing by the Director or a delegated authority. A permit issued under this subsection shall contain all provisions in subsection (D)(3) except for subsections (D)(3)(e) and (D)(3)(f). The permittee shall conduct open outdoor fires of household waste in an approved waste burner and shall either:
1. Burn household waste generated on-site on farms or ranches of 40 acres or more where no household waste collection or disposal service is available; or
2. Burn household waste generated on-site where no household waste collection and disposal service is available and where the nearest other dwelling unit is at least 500 feet away.

G. Permits issued by a delegated authority. The Director may delegate authority for the issuance of open burning permits to a county, city, town, air pollution control district, or fire district. A delegated authority may not issue a permit for its own open burning activity. The Director shall not delegate authority to issue permits to burn dangerous material under subsection (E). A county, city, town, air pollution control district, or fire district with delegated authority from the Director may assign that authority to one or more private fire protection service providers that perform fire protection services within the county, city, town, air pollution control district, or fire district. A private fire protection provider shall not directly or indirectly condition the issuance of open burning permits on the applicant being a customer. Permits issued under this subsection shall comply with the requirements in subsection (D)(3) and be in a format prescribed by the Director. Each delegated authority shall:
1. Maintain a copy of each permit issued for the previous five years available for inspection by the Director;
2. For each permit currently issued, have a means of contacting the person authorized by the permit to set an open fire if an order to extinguish open burning is issued; and
3. Annually submit to the Director by May 15 a record of daily burn activity, excluding household waste burn permits, on a form provided by the Director for the previous calendar year containing the information required in subsections (D)(3)(e) and (D)(3)(f).

H. The Director shall hold an annual public meeting for interested parties to review operations of the open outdoor fire program and discuss emission reduction techniques.

I. Nothing in this Section is intended to permit any practice that is a violation of any statute, ordinance, rule, or regulation.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Amended effective October 2, 1979 (Supp. 79-5). Correction, subsection (C) repealed effective October 2, 1979, not shown (Supp. 80-1). Former Section R9-3-602 renumbered without change as Section R18-2-602 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-602 renumbered to R18-2-802, new Section R18-2-602 renumbered from R18-2-401 effective November 15, 1993 (Supp. 93-4). Amended by final rulemaking at 10 A.A.R. 388, effective March 16, 2004 (Supp. 04-1).

R18-2-603. Repealed

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-603 renumbered without change as Section R18-2-603 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-603 renumbered to R18-2-803, new Section R18-2-603 renumbered from R18-2-403 effective November 15, 1993 (Supp. 93-4). Repealed effective October 8, 1996 (Supp. 96-4).

R18-2-604. Open Areas, Dry Washes, or Riverbeds

A. No person shall cause, suffer, allow, or permit a building or its appurtenances, or a building or subdivision site, or a driveway, or a parking area, or a vacant lot or sales lot, or an urban or suburban open area to be constructed, used, altered, repaired, demolished, cleared, or leveled, or the earth to be moved or excavated, without taking reasonable precautions to limit excessive amounts of particulate matter from becoming airborne. Dust and other types of air contaminants shall be kept to a minimum by good modern practices such as using an approved dust suppressant or adhesive soil stabilizer, paving, covering, landscaping, continuous wetting, detouring, barring access, or other acceptable means.

B. No person shall cause, suffer, allow, or permit a vacant lot, or an urban or suburban open area, to be driven over or used by motor vehicles, trucks, cars, cycles, bikes, or buggies, or by animals such as horses, without taking reasonable precautions to limit excessive amounts of particulates from becoming airborne. Dust shall be kept to a minimum by using an approved dust suppressant, or adhesive soil stabilizer, or by paving, or by barring access to the property, or by other acceptable means.

C. No person shall operate a motor vehicle for recreational purposes in a dry wash, riverbed or open area in such a way as to cause or contribute to visible dust emissions which then cross property lines into a residential, recreational, institutional, educational, retail sales, hotel or business premises. For purposes of this subsection "motor vehicles" shall include, but not be limited to trucks, cars, cycles, bikes, buggies and 3-wheelers. Any person who violates the provisions of this subsection shall be subject to prosecution under A.R.S. § 49-463.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-604 renumbered without change as Section R18-2-604 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-604 renumbered to R18-2-804, new Section R18-2-604 renumbered from R18-2-404 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-605. Roadways and Streets

A. No person shall cause, suffer, allow or permit the use, repair, construction or reconstruction of a roadway or alley without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne. Dust and other particulates shall be kept to a minimum by employing temporary paving, dust suppressants, wetting down, detouring or by other reasonable means.

B. No person shall cause, suffer, allow or permit transportation of materials likely to give rise to airborne dust without taking reasonable precautions, such as wetting, applying dust suppressants, or covering the load, to prevent particulate matter from becoming airborne. Earth or other material that is deposited by trucking or earth moving equipment shall be removed from paved streets by the person responsible for such deposits.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-605 renumbered without change as Section R18-2-605 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-605 renumbered to R18-2-805, new Section R18-2-605 renumbered from R18-2-405 effective November 15, 1993 (Supp. 93-4).

R18-2-606. Material Handling

No person shall cause, suffer, allow or permit crushing, screening, handling, transporting or conveying of materials or other operations likely to result in significant amounts of airborne dust without taking reasonable precautions, such as the use of spray bars, wetting agents, dust suppressants, covering the load, and hoods to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-606 renumbered from R18-2-406 effective November 15, 1993 (Supp. 93-4).

R18-2-607. Storage Piles

A. No person shall cause, suffer, allow, or permit organic or inorganic dust producing material to be stacked, piled, or otherwise stored without taking reasonable precautions such as chemical stabilization, wetting, or covering to prevent excessive amounts of particulate matter from becoming airborne.

B. Stacking and reclaiming machinery utilized at storage piles shall be operated at all times with a minimum fall of material and in such manner, or with the use of spray bars and wetting agents, as to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-607 renumbered from R18-2-407 effective November 15, 1993 (Supp. 93-4).

R18-2-608. Mineral Tailings

No person shall cause, suffer, allow, or permit construction of mineral tailing piles without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne. Reasonable precautions shall mean wetting, chemical stabilization, revegetation or such other measures as are approved by the Director.

Historical Note

Section R18-2-608 renumbered from R18-2-408, new Section R18-2-408 adopted effective November 15, 1993 (Supp. 93-4).

R18-2-609. Agricultural Practices

A person shall not cause, suffer, allow, or permit the performance of agricultural practices outside the Phoenix and Yuma planning areas, as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210, including tilling of land and application of fertilizers without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-609 renumbered from R18-2-409 effective November 15, 1993 (Supp. 93-4). Amended by final rulemaking at 6 A.A.R. 2009, effective May 12, 2000 (Supp. 00-2). Amended by final rulemaking at 11 A.A.R. 2210, effective July 18, 2005 (Supp. 05-2).

R18-2-610. Definitions for R18-2-611

The definitions in Article 1 of this Chapter and the following definitions apply to R18-2-611:

1. "Access restriction" means restricting or eliminating public access to noncropland with signs or physical obstruction.
2. "Aggregate cover" means gravel, concrete, recycled road base, caliche, or other similar material applied to noncropland.
3. "Artificial wind barrier" means a physical barrier to the wind.
4. "Best management practice" means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM_{10} emissions from a regulated agricultural activity.
5. "Chemical irrigation" means applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system.
6. "Combining tractor operations" means performing two or more tillage, cultivation, planting, or harvesting operations with a single tractor or harvester pass.
7. "Commercial farm" means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Maricopa PM_{10} nonattainment area.
8. "Commercial farmer" means an individual, entity, or joint operation in general control of a commercial farm.
9. "Committee" means the Governor's Agricultural Best Management Practices Committee.
10. "Cover crop" means plants or a green manure crop grown for seasonal soil protection or soil improvement.
11. "Critical area planting" means using trees, shrubs, vines, grasses, or other vegetative cover on noncropland.
12. "Cropland" means land on a commercial farm that:
    a. Is within the time-frame of final harvest to plant emergence;
    b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or
    c. Is a turn-row.

ARTICLE 8. EMISSIONS FROM MOBILE SOURCES (NEW AND EXISTING)

R18-2-801. Classification of Mobile Sources

A. This Article is applicable to mobile sources which either move while emitting air contaminants or are frequently moved during the course of their utilization but are not classified as motor vehicles, agricultural vehicles, or agricultural equipment used in normal farm operations.

B. Unless otherwise specified, no mobile source shall emit smoke or dust the opacity of which exceeds 40%.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Amended effective February 3, 1993 (Supp. 93-1). Former Section R18-2-801 renumbered to Section R18-2-901, new Section R18-2-801 renumbered from R18-2-601 effective November 15, 1993 (Supp. 93-4).

R18-2-802. Off-road Machinery

A. No person shall cause, allow or permit to be emitted into the atmosphere from any off-road machinery, smoke for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first 10 minutes.

B. Off-road machinery shall include trucks, graders, scrapers, rollers, locomotives and other construction and mining machinery not normally driven on a completed public roadway.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-802 renumbered to Section R18-2-902, new Section R18-2-802 renumbered from R18-2-602 effective November 15, 1993 (Supp. 93-4).

R18-2-803. Heater-planer Units

No person shall cause, allow or permit to be emitted into the atmosphere from any heater-planer operated for the purpose of reconstructing asphalt pavements smoke the opacity of which exceeds 20%. However three minutes' upset time in any one hour shall not constitute a violation of this Section.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-803 renumbered to Section R18-2-903, new Section R18-2-803 renumbered from R18-2-603 effective November 15, 1993 (Supp. 93-4).

R18-2-804. Roadway and Site Cleaning Machinery

A. No person shall cause, allow or permit to be emitted into the atmosphere from any roadway and site cleaning machinery smoke or dust for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first 10 minutes.

B. In addition to complying with subsection (A), no person shall cause, allow or permit the cleaning of any site, roadway, or alley without taking reasonable precautions to prevent particulate matter from becoming airborne. Reasonable precautions may include applying dust suppressants. Earth or other material shall be removed from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water or by other means.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Amended effective February 3, 1993 (Supp. 93-1). Former Section R18-2-804 renumbered to Section R18-2-904, new Section R18-2-804 renumbered from R18-2-604 effective November 15, 1993 (Supp. 93-4).

R18-2-805. Asphalt or Tar Kettles

A. No person shall cause, allow or permit to be emitted into the atmosphere from any asphalt or tar kettle smoke for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%.

B. In addition to complying with subsection (A), no person shall cause, allow or permit the operation of an asphalt or tar kettle without minimizing air contaminant emissions by utilizing all of the following control measures:

1. The control of temperature recommended by the asphalt or tar manufacturer;
2. The operation of the kettle with lid closed except when charging;
3. The pumping of asphalt from the kettle or the drawing of asphalt through cocks with no dipping;
4. The dipping of tar in an approved manner;
5. The maintaining of the kettle in clean, properly adjusted, and good operating condition;
6. The firing of the kettle with liquid petroleum gas or other fuels acceptable to the Director.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-805 renumbered to Section R18-2-905, new Section R18-2-805 renumbered from R18-2-605 effective November 15, 1993 (Supp. 93-4).

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September 1, 2010

Mr. Matt Blevins
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228-8213

Mr. Matt Blevins:

RE: Draft Environmental Impact Statement for Grapevine Wind

The Arizona Game & Fish Department (Department) has reviewed the Draft Environmental Impact Statement (DEIS) for the proposed Grapevine Canyon Wind Energy Project. The Department generally supports the development of wind energy as a viable source of clean and renewable energy. We believe with proper site placement and safeguards, the benefits of utilizing wind energy outweigh the potential for negative effects to wildlife populations. While we believe that wind can be a viable option for energy, we are concerned that specific sites may have an increased potential for negative impacts to certain breeding, migratory, and wintering species. To address these concerns and to facilitate working relationships with project partners, the Department has created Wind Energy Guidelines entitled *Guidelines for Reducing Impacts to Wildlife from Wind Energy Development in Arizona*. These guidelines can be found on our website at http://www.azgfd.gov/hgis/guidelines.aspx. We appreciate your willingness to use the Guidelines thus far, and the opportunity to comment on this draft document. We look forward to continued discussion regarding wildlife and habitat issues related to this matter.

Below are the Department's comments on the DEIS for the Grapevine project:

S-2.1 As we have communicated previously, the Department considers the proposed Grapevine Canyon Wind Energy Project to be a **Category 3** project under our Wind Guidelines. Category 3 project sites have high or uncertain potential for wildlife impacts involving birds and/or bats, special status species, or other species. Characteristics that indicate high potential wildlife impacts at the Grapevine Canyon project site include the number of proposed turbines and project size, special status species occurring on or adjacent to the site, and the presence of current or historic prairie dog colonies that may concentrate raptor activity. In many respects, the potential impacts to wildlife species and habitats are uncertain in this project area, and therefore the Department recommends:

S-2.2 1. Prior to construction, at least two years of pre-construction bird and bat data be collected with special attention to characterizing seasonal and spatial variability in species' use.
S-2.3 2. Biological inventories be completed for Sites B and C prior to construction in Site A

AN EQUAL OPPORTUNITY REASONABLE ACCOMMODATIONS AGENCY

S-2.4 3. A post-construction monitoring plan designed to assess the impacts of operation on wildlife consistent with the Department's Wind Guidelines, Table 4.

While we recognize that biological inventory and one year of pre-construction data collection have been completed for Site A; we recommend completion of the second year of data collection for Site A as well as completion of inventory and two years of data collection for Sites B and C, not to be conducted concurrently with construction in any part of the project area. S-2.5 The Department finds the applicants' plan for one year of post-construction monitoring, as articulated on page 56 of the DEIS, to be inadequate. All of the above concerns have been raised by the Department in prior conversations with the project personnel.

Construction phasing

S-2.6 According to the DEIS, Foresight Flying M, LLC expects construction to begin in 2011, preceding completion of pre-construction data for Sites B and C. We request clarification of the phasing proposed throughout the document. On page 10, for example, the authors describe concurrent construction of facility components. It is unclear how the three sites will be treated as well as the exact extent of Phase 1 and Phase 2 of construction. Additionally, we would like further discussion of the expected construction scenarios for build out to 250 MW versus full build out to 500 MW. We recommend clarification of the project timeline, allowing for two full years of data collection for all three study areas before construction in any study area begins.

S-2.7
S-2.2

Golden eagles

Golden eagles (*Aquila chrysaetos*) are considered a species of greatest conservation need (SGCN) as per the Department's State Wildlife Action Plan. In addition, golden eagles are protected by the Bald and Golden Eagle Protections Act (BGEPA), therefore they should be considered as a special status species. We are concerned that the DEIS underestimates the potential for negative impacts on golden eagles. As stated earlier, pre-construction surveys for raptor use should be continued for at least one additional year (total of 2 years pre construction per project area), as golden eagle nesting tends to be cyclic and during some years breeding pairs may not lay eggs in a territory. In addition, other raptor species utilize more than one nest site between years, making multi-year surveys important for assessing impacts to a number of species.

S-2.8 The BGEPA requires specific authorizations and resource protection measures not addressed in Tables 1.3-2 and 2.7-1 of the DEIS. Status under the Act should be acknowledged for both bald and golden eagles throughout the document. Further, standards established in the act, such as a 10-mi project area buffer of analysis where eagles are affected, should be followed. The DEIS proposes a two-mile buffer for construction activities around a nest (pp 94), a distance that is

S-2.9
S-2.8

likely to be insufficient. Additionally, the authors omitted golden eagles from Table 4.2-2; golden eagles should be considered in the section on past, present, and reasonable foreseeable future effects. We recommend consultation with USFWS to determine appropriate measures to address bald and golden eagles under BGEPA, including the development of advanced conservation practices (ACPs). The ACP document should address prairie dog towns, nest sites, and other factors affecting golden eagle movement and survival.

Pronghorn

The Grapevine Canyon project area provides important big game habitat in this region and has been a focal management area for the Department. Since the early 1990s, we have made significant investments to research the declining pronghorn (*Antilocapra americana*) herds and to implement extensive habitat improvement projects to increase the population. Many of these restoration projects have occurred within and adjacent to the project area, which is known to be utilized by pronghorn. Language in the DEIS underestimates the uncertainty regarding potential negative impacts the project may have on big game and their habitats. We are aware of only one study, conducted by West, Inc. in Wyoming where pronghorn populations are generally larger, that indicates some big game resilience to wind development. We caution against generalizing such findings to northern Arizona grasslands and recommend mitigating support for further research and monitoring to assess the effects of wind development on big game species. **S-2.10**

The Department recognizes the authors' inclusion of Anderson Mesa pronghorn concerns in the DEIS. We would like to emphasize that the data we provided the applicant are from a study not designed specifically to assess movement through the project area. The data do demonstrate that individual animals move through all three project study areas (A, B, and C), but were not collected explicitly to assess the degree to which pronghorn utilize the area or to measure the potential impacts of development on pronghorn movement, behavior, or reproductive success. **S-2.10** At this point, we simply cannot say that the project will not have impacts of big game movement or populations. Therefore, the Department recommends Foresight's support for further Game & Fish research, specifically aimed at better understanding the impacts of wind project construction and operation on big game, including pronghorn. Our Research Branch has internally approved a research proposal to this end and requests further communication with the interested parties to discuss funding and study implementation as a form of mitigation. **S-2.10**

Prairie dogs

Game & Fish surveys from 2007 located active prairie dog colonies in Study Area A, as the DEIS describes, but also located colonies in Study Area C. Page 102 of the DEIS concludes that raptor mortality risk is likely to be lower in Study Areas B and C, based on the assessment that prairie dog numbers are lower in these locations. This assertion is made without the benefit of inventory for Area B or C. The presence of prairie dogs in Area C, in addition to the topographic features within Study Area B, lead us to suspect that the risk of raptor mortality may be similar or even greater in Study Areas B and C than it is in Study Area A. The Department recommends that inventory and two full years of bird and bat data be collected in Study Areas B and C *before* construction begins anywhere within the project area. **S-2.11**

Bats

In order to accurately describe the bat populations within the state, contacting the state wildlife agency, rather than an NGO list, is a more efficient and accurate means (p. 95). In addition, the Department recognizes 28 species of bats that occur in Arizona (not 30). **S-2.12**

Although "no known bat hibernaculum or roosts of importance have been noted within the vicinity of the wind park study area", it is important to note that approximately half of AZ's 28 species hibernate, and that there are approximately 10 or fewer known hibernacula for all **S-2.13**

S-2.13 hibernating bat species in AZ; therefore, saying "no known bat hibernacula" is certainly not an indication that there's an absence of those type of roosts (p. 104).

With respect to this statement, "However, if the first year's monitoring suggests an extraordinary fatality rate or where weather conditions are highly variable to substantially…" (Page 56), the Department requests that project personnel define "extraordinary fatality rate". We recommend that rate might be ≥ 2 bats/turbine/year. S-2.14

Big Free-Tailed Bat

S-2.15 The Department disagrees that the potential for occurrence of the big free-tailed bat *(Nyctinomops macrotis)* is "moderate". This species can fly great distances between roosting and foraging areas therefore we would recommend that potential for occurrence is "High" within the project area. (DEIS Vol II, Appendix D.1 p. 53).

Allen's big-eared bat

S-2.16 With respect to Allen's big-eared bat, we disagree with the finding that the potential for occurrence is "low". Because of the potential for this species to occur in adjacent areas, and because this bat can easily travel 20 miles one way in a night between forage and roosting areas, there is a "high" likelihood for this species occurrence (Page 54). The Department recommends that where Allen's lappet-browed bats are referenced in the DEIS, that project personnel articulate their ability to fly long distances and increase their potential to occur to reflect "high".

S-2.17 The Department disagrees that the proposed transmission line project will not affect breeding habitat or important potential hibernacula for the Allen's lappet-browed bat. Although there are no caves and mines used by the species for roosting, present within the transmission line footprint, this species may pass through the transmission line area in transit between foraging areas in the surrounding region. Lastly, we have no records in this state for Allen's lappet-browed bat hibernacula, therefore at this time it is impossible to evaluate many issues associated with effects to this species.

Met towers

S-2.18
S-2.19
As articulated in our prior scoping comments, the Department requests that met towers be unguyed and free-standing (not lattice type). Where guy wires are necessary, we ask that BFDs be used. For aircraft safety, all met tower locations should be provided to the Department. For towers that are on site for more than one year, we recommend that carcass searches be implemented, especially during the bird migration period. We further recommend acoustical monitoring across seasons with an emphasis on bat migration periods (August 16 – October 31). The applicant should work with the Department to determine the extent of acoustical monitoring that is appropriate to assess bat impacts.

Turbine Construction, turbine arrangement, and operating schedule

S-2.20 The Grapevine project area is located within pronghorn fawning habitat. If possible, the Department recommends that project personnel considering avoiding construction during March 15- May 31st. In addition, we want to emphasize the importance of flexibility to arrange and operate turbines in such a way that impacts on wildlife can be avoided, minimized, and/or

S-2.21 mitigated. As articulated in our Wind Guidelines, negative impacts on wildlife can be reduced with tower configurations that utilize clustering to minimize gaps and that incorporate non-bladed pylons at string edges.

Page 27 of the DEIS references an operating schedule of 24 hours per day, 365 days per year. S-2.22 We request the applicant consider greater flexibility to allow particular turbines to be turned off during certain times to avoid negative impacts on wildlife, particularly migratory birds or mammals. Curtailment strategies, such as reducing cut-in speeds, may be another effective mitigation strategy to reduce bat fatalities (Arnett et al. 2010). Pre- and post-construction studies are expected to be particularly useful in informing turbine arrangement and operating schedules.

Rehab and re-vegetation of sites – The Department is encouraged that most associated infrastructure for the wind project will be located underground. With respect to ground disturbing activities that require re-vegetation, the Department recommends the following: Because the Grapevine area is prone to invasion by several weedy species, most notably cheat S-2.23 S-2.24 grass *(Bromus tectorum),* the Department would like project personnel to consider monitoring of the disturbed sites for multiple years ensuring that cheat grass does not become established. In the event that it does, there are annual specific herbicides such as Oust™ and Plateau™ that can be used effectively to eliminate its occurrence. For seeding techniques and species assemblages to consider, the Department recommends referring to Monsen, et al. 2004, *Restoring Western Ranges and Wildlands.*

Trenching and borrow pits

S-2.25 The Department recommends several strategies to minimize negative impacts associated with trenching and ditches during construction. Trenches should be covered or back-filled as soon as possible, and should always be covered overnight. Activities should be concentrated so that the area affected by digging or backfilling at any one time is as small as possible. Monitor pits and trenches often during and after construction. Work with the Department to determine the best time of year to dig with minimal impacts on wildlife. Incorporate escape ramps in ditches or fencing along the perimeter to deter small mammals and herpetofauna (snakes, lizards, etc) from entering ditches. Escape ramps should be constructed at least every 90 meters and can be short lateral trenches sloping to the surface or wooden planks extending to the surface. The slope should be less than 45 degrees (100%). See NMDGF's Guidance for Oil and Gas Development (full citation below) for further guidance.

Access:

The DEIS states on page 21 that "Service road public access would be based on consultation with State trust and private landowners. Select wind park access or service roads that do not S-2.26 access public lands may be gated with limited public access". The Department requests that project personnel work with the Department to discuss any limited access to state and private lands as access into these lands are crucial in meeting hunting objectives (especially elk and pronghorn).

The Department appreciates the opportunity to comment at this draft stage of the EIS process and looks forward to working with the interested parties to incorporate our concerns for wildlife in the final document. Please contact me with any further questions or concerns that you may have.

Sincerely,

Andi Rogers
Habitat Specialist
Arizona Game & Fish Department
3500 S. Lake Mary Rd
Flagstaff, AZ 86001
(928) 214-1251

Citations:

Arnett, E. B., M. M. P. Huso, J. P. Hayes, and M. Schirmacher. 2010. Effectiveness of changing wind turbine cut-in speed to reduce bat fatalities at wind facilities. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

New Mexico Department of Game and Fish. 1994. Guidelines for Oil and Gas Development and Fish and Wildlife Resources.

Monsen. S. B., R. Stevens, N. Shaw. Restoring Western Ranges and Wildlands. 2004. Gen. Tech. Rep. RMRS- GTR-136. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Vol 1-3.

White Mountain Apache Tribe Heritage Program
PO Box 507 Fort Apache,AZ 85926
1 (928) 338-3033 Fax: (928) 338-6055

To: Mr. Matt Blevins – Western Area Power Administration
Date: July 27, 2010
Project: Grapevine Canyon Wind Project Draft Environmental Impact Statement (DOC/EIS-0427)
………

The White Mountain Apache Historic Preservation Office (THPO) appreciates receiving information on the proposed project, dated July 20, 2010 In regards to this, please attend to the checked items below.

► ***There is no need to send additional information unless project planning or implementation results in the discovery of sites and/or items having known or suspected Apache Cultural affiliation.***

☐ The proposed project is located within an area of probable cultural or historical importance to the White Mountain Apache Tribe (WMAT). As part of the effort to identify historical properties that maybe affected by the project we recommend an ethno-historic study and interviews with Apache Elders. The Cultural Resource Director, ***Mr. Ramon Riley*** would be the contact person at (928) 338-4625 should this become necessary.

► Please refer to the attached additional notes in regards to the proposed project:

We have received and reviewed the draft data Environmental Impact Statement for the proposed Grapevine Canyon Wind Project which is located 28 miles southeast of Flagstaff, Arizona, and we've

T-1.1 determined the proposed actions for the above mentioned project ***will not have an effect*** on the White Mountain Apache tribe's Cultural Heritage Resources and/or historic properties and at this point we do not believe it is necessary to contact and/or include the tribe any further. Regardless, we further recommend that any/all ground disturbance should be monitored ***if*** there are reasons to believe that human remains and/or funerary objects are present, if such remains and/or objects are encountered all construction activities should be stopped and the proper authorities and/or affiliated tribe(s) be notified to evaluate the situation.

We look forward to continued collaborations in the protection and preservation of places of cultural and historical significance.

Sincerely,

Mark T. Altaha

White Mountain Apache Tribe
Historic Preservation Officer
Email: markaltaha@wmat.us

September 7, 2010

John R. Holt, Environmental Manager
Attention: Matt Blevins
Department of Energy, Western Area Power Administration
P.O. Box 6457
Phoenix, Arizona 85005-6457

Re: Grapevine Canyon Wind Project Draft Environmental Impact Statement (DOE/EIS-0427)

Dear Mr. Holt,

This letter is in response to your correspondence dated July 20, 2010, regarding an enclosed Foresight Flying M LLC, Western Area Power Administration (WAPA), and Coconino National Forest (CNF) Grapevine Canyon Wind Project Draft Environmental Impact Statement (DEIS). The Hopi Tribe claims cultural affiliation to prehistoric cultural groups in this area of potential effect. The Hopi Cultural Preservation Office supports the identification and avoidance of prehistoric archaeological sites and we consider the prehistoric archaeological sites of our ancestors to be Traditional Cultural Properties. Therefore, we appreciate Western Area Power Administration and Coconino National Forest's continuing solicitation of our input and your efforts to address our concerns.

The Hopi Cultural Preservation Office previously responded to your October 5, 2009, and December 3, 2009, correspondences on this proposal in the enclosed letters dated October 28, 2009, and April 28, 2010. We have received and reviewed the draft Programmatic Agreement and Preliminary Draft Class I Cultural Resources Overview. We also participated in a site visit on February 9, 2010, and had two consultation meetings on April 21, 2010, and August 17, 2010, with representatives of the Western Area Power Administration, the proponents and contractors. We understand the proposal consists of a wild generating facility, a transmission line, and a switchyard.

,

In our April 28, 2010, letter we reviewed the Class I Overview and stated we understood the proposal involves 50,967 acres of State land, 44,035 acres of private land and 275 acres of Forest land. We requested a 100% Class III survey of the area of potential effect, and that the areas of proposed disturbance be defined. We expressed our concern about adverse effects on cultural and biological resources, and we requested that a Native American Graves Protection and Repatriation Act plan of Action be developed.

John R. Holt
September 7, 2010
Page 2

The Hopi Cultural Preservation Office has now reviewed the DEIS and offer the following comments:

T-2.1 T-2.2 Regarding cultural resources, on pages xvi, 48, and 189, Tables ES5.1, 2.5-1 and 4.2-2, we consider the effects to Cultural Resources, areas of interest to Native Americans, and visual impacts on Traditional Cultural Properties to be adverse. We do not believe the proposed Programmatic Agreement will ensure protection of National Register eligible archaeological sites and Traditional Cultural Properties, as asserted on page 57.

T-2.3 As we stated previously, we understand 678 previously recorded cultural resources have been identified in the cultural resources evaluation area, and that the area has only had a small percentage of Class III survey. We do not believe that based on proposed Programmatic Agreement, "there would be no significant impacts to, or loss of a site of archaeological, Tribal or historical value that is listed, or eligible for listing, on the NRHP," or that "there would be no adverse effect on cultural sites" as asserted on page 112. If there are no adverse effects anticipated, why has a Programmatic Agreement be developed to mitigate adverse effects to unidentified cultural resources? This determination is based on insufficient data and is premature.

T-2.4 On page 180, the DEIS acknowledges "Any unavoidable adverse impacts to cultural resources cannot be determined until the results of the Class III Survey and traditional Cultural Properties Survey are completed." On page 194, however, the DEIS asserts "Because the proposed action is not likely to destroy NRHP eligible sites, there would be no direct contribution to cumulative effects to cultural resources."

T-2.5 Therefore, we have determined that this proposal will have significant adverse effects on Hopi ancestral National Register eligible archaeological sites and Hopi Traditional Cultural Properties.

Regarding Biological Resources, at our administrative meetings and our April 28, 2010, letter, we expressed concern regarding the impact of the wind farm on eagles and migratory birds. We have reviewed the Wildlife and Botanical Report, and we consulted with David Tidhar of Western EcoSystems Technology, Inc. on August 17, 2010.

T-2.6 There are Hopi eagle shrines adjacent to Study Area A and a two mile buffer zone and we continue to be concerned of their potential mortality from 500 foot tall wind turbines. After reviewing the DEIS, it is clear that there will be eagle, raptor and other bird mortality as a result of this project. A "formal post-construction monitoring study designed to estimate and address avian and bat mortality" is a body count, indicating that eagle, raptor, and bird mortality is a certain result of this proposal. The only question is, how many?

John R. Holt
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Page 3

The DEIS repeatedly states "Construction and operation of the proposed project may result in direct impacts to the birds, raptors and bats through collision or electrocution with the wind turbines and power lines" and cites the 2006 Suggested Practices for Avian Protection on Powerlines. However, we are also aware of the U.S. Fish and Wildlife Service April, 2010, Wind Turbine Guideline Advisory Committee Recommendations to the Interior Secretary and the new State Game and Fish Department guidelines regarding wind farms and bird mortality. This DEIS and the project specifications need to be revised to reflect these new recommendations.

T-2.6

T-2.7 Therefore, we have determined that this proposal will cause significant adverse effects to biological resources significant to the Hopi Tribe. We do not support a crossing of Diablo Canyon, or any disturbance, within the Canyon, or on the east side of the Canyon.

T-2.8
T-2.9 This DEIS has no alternatives other than the Proposed Alternative and alternative transmission lines, and is therefore inadequate pursuant to the National Environmental Policy Act. This DEIS is general, the proposed project is phased, and the proposed project area is oversized.

T-2.10 And therefore, based on potential adverse effect to cultural and biological resources, and the lack of alternatives, we support the No Action Alternative in this DEIS. We recommend WAPA and CNF develop an alternative that defines the project area as Study Area A and eliminates Study Areas B and C from further consideration.

If you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at 928-734-3619 or tmorgart@hopi.nsn.us. Thank you for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

Enclosures: October 28, 2009; April 28, 2010 letters

xc: Forest Supervisor, Coconino National Forest
Governor, Zuni Tribe
Arizona State Historic Preservation Office

THE NAVAJO NATION

Joe Shirley, Jr.
President

Ben Shelly
Vice-President

August 30, 2010

Mike Dechter
Coconino National Forest
Forest Supervisor's Office
1824 South Thompson St.
Flagstaff, AZ 86004

Dear Mr. Dechter:

On July 20, 2010, the Historic Preservation Department – Traditional Culture Program (hereafter, HPD-TCP) received the proposed Department of Energy (DOE), Western Area Power Administration in cooperation with the U.S. Department of Agriculture, Forest Service, Coconino National Forest and the Arizona State Land Department's Grapevine Canyon Wind Project Draft Environmental Impact Statement (DOE/EIS-0427).

We have some concerns with the proposed project. After cross-referencing the HPD-TCP Sacred Sites Database, there are numerous Cultural Sacred Site located within the proposed project area. **T-3.1** The Nation understands the project area lies within both private and State trust lands, so all we can emphasize is our concerns with the proposed project area. We request the Navajo Nation be kept updated with the progress of the proposed project.

T-3.2 If the proposed project inadvertently discovers Navajo habitation sites, plant gathering areas, human remains and objects of cultural patrimony, the HPD-TCP request that we be notified respectively in accordance with the Native America Graves Protection and Repatriation Act (NAGPRA).

In conclusion, the HPD-TCP appreciates the Department of Energy for consulting the Navajo Nation pursuant to 36 CFR 800.1 (c)(2)(iii). If you have any questions, concerns, or require additional information, do not hesitate to contact me at 928-871-7750. Thank you for your cooperation.

Sincerely,

Tony H. Joe, Jr., Supervisory Anthropologist
Traditional Culture Program
Historic Preservation Department

Cc TCP 10-643
Department of Energy

CREDA
Colorado River Energy Distributors Association

ARIZONA
Arizona Municipal Power Users Association

Arizona Power Authority

Arizona Power Pooling Association

Irrigation and Electrical Districts Association

Navajo Tribal Utility Authority
(also New Mexico, Utah)

Salt River Project

COLORADO
Colorado Springs Utilities

Intermountain Rural Electric Association

Platte River Power Authority

Tri-State Generation & Transmission Association, Inc.
(also Nebraska, Wyoming, New Mexico)

Yampa Valley Electric Association, Inc.

NEVADA
Colorado River Commission of Nevada

Silver State Energy Association

NEW MEXICO
Farmington Electric Utility System

Los Alamos County

City of Truth or Consequences

UTAH
City of Provo

City of St. George

South Utah Valley Electric Service District

Utah Associated Municipal Power Systems

Utah Municipal Power Agency

WYOMING
Wyoming Municipal Power Agency

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August 27, 2009

Mary Barger
Western Area Power Administration
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E-mail: GrapevineWindEIS@wapa.gov

RE: Scoping Comments – Grapevine Canyon Wind Project

Dear Ms. Barger:

In response to Western Area Power Administration's (Western) Notice of Intent to Conduct an Environmental Impact Statement, published in the Federal Register July 24, 2009 (Vol. 74, No. 141), the Colorado River Energy Distributors Association (CREDA), offers the following comments.

CREDA's members include the majority of firm electric service customers of the Colorado River Storage Project (CRSP), which have entered into long-term contracts (2024) for the delivery of resources from the CRSP. The proposed Grapevine Project is anticipated to interconnect a new 345 kV transmission line and new switchyard with the Glen Canyon-Pinnacle Peak transmission line, which is a key element of the CRSP power and transmission delivery system. As part of Western's socio-economic evaluation of this proposal, it should evaluate the potential impacts on Western's current firm electric and transmission service customers, from operational and rates perspectives. Analysis of specific cost allocation and cost responsibility methodologies should be employed.

The project proponent indicated at the scoping meeting that it anticipates selling the project's expected 500 MW of output to local and regional entities. Western's analysis should include how the addition of this resource will affect system reliability and operational impacts, including control area and other issues associated with the integration of an intermittent resource, on an already constrained transmission path.

Please include CREDA in any future distribution of materials and information on this proposed project.

Sincerely,

/s/ Leslie James

Leslie James
Executive Director

Cc: CREDA Board

CREDA
Colorado River Energy Distributors Association

ARIZONA
Arizona Municipal Power Users Association

Arizona Power Authority

Arizona Power Pooling Association

Irrigation and Electrical Districts Association

Navajo Tribal Utility Authority (also New Mexico, Utah)

Salt River Project

COLORADO
Colorado Springs Utilities

Intermountain Rural Electric Association

Platte River Power Authority

Tri-State Generation & Transmission Association, Inc. (also Nebraska, Wyoming, New Mexico)

Yampa Valley Electric Association, Inc.

NEVADA
Colorado River Commission of Nevada

Silver State Energy Association

NEW MEXICO
Farmington Electric Utility System

Los Alamos County

City of Truth or Consequences

UTAH
City of Provo

City of St. George

South Utah Valley Electric Service District

Utah Associated Municipal Power Systems

Utah Municipal Power Agency

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September 7, 2010

Mr. Matt Blevins
Western Area Power Administration
Mail: P.O. Box 281213, Lakewood, CO 80228-8213
E-mail: GrapevineWindEIS@wapa.gov

RE: Comments - Grapevine Canyon Wind Project Draft EIS

Dear Mr. Blevins:

The Colorado River Energy Distributors Association (CREDA), offers the following comments on the Draft Environmental Impact Statement (DEIS) dated July 2010 for the Grapevine Canyon Wind Project (DOE/EIS-0427). These comments should be considered supplementary to the comments we submitted on August 27, 2009 during the scoping process (attached).

1) Page 4: One of the project's objectives is to "interconnect to an electrical transmission system with available capacity that ties into the regional electric grid." Has a determination been made by Western Area Power Administration, in response to a request for transmission service, that the underlying transmission system has sufficient transmission capacity to accommodate the power flows from this project with no reliability or transfer capability, or contract rights impacts to existing uses? Reference is made on page 5 to transmission and system studies. Have these studies been completed, and if so, what are the findings? Are there system upgrades or additional facilities necessary to accommodate the project? If so, there is no reference with the current project scope. **U-1.1** **U-1.2**

2) Page 8, Table 1.4-1: The Socioeconomic portion of this table incorporates by reference comments made by CREDA during scoping, and refers to sections 2.7, 3.7 and 3.9. However, those subsequent sections do not specifically address the submitted comments. **U-1.3**

Please include CREDA in any future distribution of materials and information on this proposed project.

Sincerely,

/s/ Leslie James

Leslie James
Executive Director

Cc: CREDA Board

From: Slick David P (Dave) [Dave.Slick@srpnet.com]
Sent: Tuesday, September 07, 2010 5:21 PM
To: GrapeVineWindEIS GrapeVineWindEIS
Cc: Duckworth Charles B (Charlie); Brickley Daniel A (Dan); Coggins John D; Mellentine Stephen B
Subject: September 2010 Grapevine Canyon Wind Project EIS Comments
Attachments: Grapevine Canyon Wind Project EIS Process Comments

September 7, 2010

Mr. Matt Blevins

Western Area Power Administration
P.O. Box 281213

Lakewood, CO 80228-8213

Mr. Blevins,

SRP submits the following comments about the draft Grapevine Canyon EIS report.

U-2.1

1. The EIS does not explain how Western would be able to support proposed project objectives from a transmission rights perspective.

According to Western's OASIS site, no long term firm transmission rights are available on the Glen Canyon – Pinnacle Peak path in the southbound direction, and by 2012 only 156 mw of long term firm transmission rights are available on the Glen Canyon – Pinnacle Peak path in the northbound direction. Furthermore, according to Western's OASIS site, adequate northbound rights for the proposed full build out of the project to 500 mw are not be available until 2019.

Foresight's stated objectives include interconnecting with "an electrical transmission system with available capacity that ties into the regional electric grid" and providing a "utility-scale wind generating facility that would help achieve state and/or regional renewable energy

U-2.2

standards". With the limited number of parties subject to state and/or regional renewable energy standards that could take delivery from Foresight at Glen Canyon, and the lack of transmission rights available to support delivery of any project output to Pinnacle Peak, the EIS does not appear to explain how Foresight's stated objectives could be met.

2. Responses to previously submitted comments are not provided.

U-2.3

On page 8 of Chapter 1 "Purpose and Need", the EIS claims that responses to previously submitted socioeconomic comments are provided in sections 2.7, 3.7 and 3.9 of the EIS. However, none of SRP's previously submitted comments (attached) are addressed in these sections of the report.

<<Grapevine Canyon Wind Project EIS Process Comments>>

Respectfully submitted,

Dave Slick

Manager of Strategic Projects

Energy Management & Information

SRP

(602) 236-2082

IRRIGATION & ELECTRICAL DISTRICTS ASSOCIATION OF ARIZONA

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E-MAILED ONLY
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September 7, 2010

Mr. Matt Blevins
Western Area Power Administration
P.O. Box 281213
Lakewood, Colorado 80228-8213

Re: Comments on the Proposed Grant of Interconnection to the Glen Canyon – Pinnacle Peak 345-kV Transmission Lines; Comments on the Draft Environmental Impact Statement for the Grapevine Canyon Wind Project, 75 Fed.Reg. 43161 (July 23, 2010)

Dear Mr. Blevins:

The Irrigation & Electrical Districts Association of Arizona (IEDA) is an Arizona non-profit association whose members purchase federal hydropower from the Western Area Power Administration (Western) and the Arizona Power Authority. Fifteen of our members and associate members contract with Western for power from the Colorado River Storage Project (CRSP). That power is delivered to IEDA members and other Southern Division CRSP contractors on the Glen Canyon - Pinnacle Peak 345 –kV system. Since Western is contemplating whether to grant an interconnection to this proposed project on this very system, our members have a direct and abiding interest in the outcome of the process under the National Environmental Policy Act (NEPA) and Western's ultimate decision.

In our August 25, 2009 comments on the scoping of the Environmental Impact Statement for this major federal action, we objected to Western considering environmental impacts of the interconnection of this wind farm to the Glen Canyon – Pinnacle Peak system without considering the impacts of providing transmission service once that interconnection had been made. We expressed our concern about constraints on the transmission system and the lack of analysis of impacts on existing customers and the reliability of the system. We urged Western to expand its analysis to cover the possible impacts of transmission service while looking at the localized impacts of the interconnection itself. Obviously, our comments fell on deaf ears.

Even a cursory reading of the Draft Environmental Impact Statement (DEIS) shows that Western intends to address the request for interconnection separately from what is anticipated to be thereafter a request for transmission service for this project, not only as to the two federal applications required to deliver the anticipated wind energy to market but as to the environmental impacts associated with granting both applications.

SERVING ARIZONA SINCE 1962

Mr. Matt Blevins
September 7, 2010
Page 2

It is certainly true that under FERC Order 888 and 889 and Western's Open Access Transmission Tariff (OATT), Western may entertain an interconnection request separately from a transmission service request. The logic of such separate processes is obvious. A generator wishing to connect to a system may market its generation resource on a basis of requiring the purchaser to arrange for transmission. In such a situation, the generation builder would not contemplate making application for transmission service from a transmission system owner/operator.

But that is not this case. One of the stated purposes in the DEIS for this project is "[t]o interconnect to an electrical transmission system with available capacity that ties into the regional grid." (DEIS, p.4.) This intent is further explained on that same page by articulating the project developer's need for transmission service "so that the energy produced could be marketed to utility companies in Arizona and other western States to meet their State portfolio standards and energy requirements." (Ibid.)

Western acknowledges that transmission service will be required in this instance and anticipates receiving a request for transmission service. Western acknowledges the relationship between the pending interconnection request and the providing of transmission service: "If there is available capacity in the transmission system, Western provides transmission services through an interconnection request." (Ibid.)

The need to assess the impacts on system reliability and existing customers is acknowledged on the very next page (p.5):

> "Protecting Transmission System Reliability and Service to Existing Customers: Western must ensure that existing reliability and service are not degraded. Western's Large Generator Interconnection Procedures provide for transmission and system studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the proposed project and ensure that they are in the project scope."

Having reached this point in the DEIS, we anticipated reading that the necessary studies were completed and our concerns were unfounded. We were led further down this primrose path when we got to page 8 and saw that the impact chart related to socioeconomic impacts included our prior comments and those of the Colorado River Energy Distributors Association (CREDA) about customer impacts, referring the reader to three later sections of the DEIS.

However, our optimism was short-lived. None of the three sections cited in the DEIS says anything at all about customer impacts or system reliability or any possible studies related to those subjects.

U-3.1

The studies are mentioned in Section 2.1.1. on page 9 as being 1) an Interconnection Feasibility Study, 2) an Interconnection System Impact Study, and 3) an Interconnection Facilities Study. Western states that, based on the completion of these studies, it proposes to modify its transmission system with the addition of the switchyard and the interconnection to the Glen Canyon – Pinnacle Peak lines. Other than the reference on page 5, this is the only place in the entire DEIS where these studies are mentioned. Not only are these studies not otherwise mentioned, there is no description of, analysis of,

Mr. Matt Blevins
September 7, 2010
Page 3

U-3.1 or cumulative analysis of any impacts to existing customers or to system reliability mentioned at all in this document. Nor are system reliability or customer impacts assessed in the analysis of irreversible and irretrievable commitments of resources even though the document defines this project as being in place for at least 25 years. The studies mentioned are also not listed in the references for the DEIS.

We are forced to the conclusion that, if these studies are underway, they have not been completed, or if completed, they have been inexplicably withheld from this analysis. Our concern is heightened by the statement on page 9: "Transmission service study work is underway and ongoing."

U-3.2 This piecemeal approach to environmental analysis is captured quite succinctly by the following statement (p.9):

> "Details, requirements, and environmental impacts for any other system improvements are unknown at this time, since they would be dictated by the on-going transmission service studies. These studies may identify additional upgrades needed to accommodate the transmission service needs, including modifications at other existing Western substations that could include, but would not be limited to, installing new control buildings; new circuit breakers and controls; adding new electrical equipment, which would include installing new concrete foundations for electrical equipment and buildings, substation bus work, cable trenches, buried cable grounding grid, and new surface grounding materials; and/or replacing existing equipment and/or conductors with new equipment and/or conductors to accommodate the requests for transmission service."

U-3.3 The very next sentence (p.10) sums up the strategy: "If any needed transmission system modifications are identified after the completion of the EIS, Western and the Forest Service would address the environmental impacts of these modifications in accordance with regulatory requirements."

The above quotes are followed by the penultimate *non sequitur*: "The transmission lines have capacity available to transmit additional electricity." (p.10.) Of course the statement doesn't say how much or in which direction or whether the existing capacity can carry the generation contemplated by the proposed project. It is a bald, totally unsupported statement. It follows on the heels of Western's tacit admission that it hasn't completed its studies and does not know whether there is sufficient available transfer capability for this project, or conversely, that it has completed these studies but is withholding the results.

We recognize that the project is being located in a fashion so that it will interconnect to the Glen **U-3.4** Canyon – Pinnacle Peak lines. In order for the project to succeed, it must have that interconnection. Just as importantly, in order for the project to succeed, it must have transmission service from Western to get the generation to the markets contemplated by the developer.

In this situation, Western has no choice but to complete the transmission-related studies, analyze the environmental impacts, including socioeconomic impacts, and report those in <u>this</u> Environmental Impact Statement. Indeed, if these impacts are significant, Western may need to republish a Draft Environmental Impact Statement. 40 C.F.R. § 1502.9(a). In any event, it cannot avoid having the environmental analysis include impacts on system reliability and on existing customers.

Mr. Matt Blevins
September 7, 2010
Page 4

U-3.4 Western must analyze the effects of providing transmission service in this situation because the project purposes cannot be accomplished without such transmission service. These are direct effects of the proposed action to approve interconnection. 40 C.F.R. § 1508.8(a). Even if one were to define these as "indirect effects", they must be analyzed. Sylvester v. U.S. Army Corps of Engineers, 884 F.2d 394, 400 (9th Cir. 1989). Where there is such a close relationship between the approval of interconnection and the granting of transmission service, the proposed and the second action are "two links of a single chain." Sylvester, 884 F.2d at 400. Clearly the transmission service requirement would generate effects "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." 40 C.F.R. § 1508.8(b). Bifurcating the application process in this instance does not allow bifurcation of the environmental analysis under NEPA. City of Davis v. Coleman, 521 F.2d 661, 674 (9th Cir. 1975); Border Power Plant Working Group v. Department of Energy, 260 F.Supp.2d 997, 1013-1016 (S.D. Calif. 2003).

Thank you for the opportunity to comment on this important and potentially significant impact to the Colorado River Storage Project transmission system. Please let us know when the above-referenced transmission studies have been completed and the analysis of impacts to system reliability and to the existing customers has been drafted.

Sincerely,

/s/

Robert S. Lynch
Counsel and Assistant Secretary/Treasurer

RSL:psr
cc: Tim Meeks, Administrator, WAPA
Darrick Moe, Regional Director, WAPA
Leslie James, Executive Director, CREDA
IEDA Presidents/Chairmen and Managers

ATTACHMENT A

VISUAL RESOURCES – PHOTGRAPHIC SIMULATIONS

ATTACHMENT A

VISUAL RESOURCES – PHOTGRAPHIC SIMULATIONS

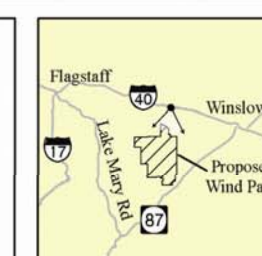
Photo

Simulation

Proposed Action - KOP #1 (Intersection of I-40 and Meteor Crater Road)

This depicts one possible view of the proposed wind park. The view pans from the southeast to the southwest from a point near the intersection of Interstate 40 and Meteor Crater Road. The rim of Meteor Crater is located near the left-hand side of the photograph and Anderson Mesa is located near the right-hand side of the photograph. WTGs are depicted at a height of approximately 430 feet, with the nearest WTGs approximately six and one-half miles away, located within background views.

Grapevine Canyon Wind Project



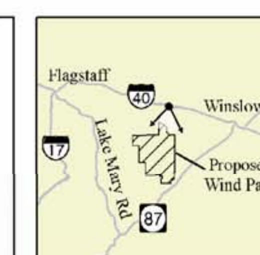

Photo


Simulation

Proposed Action - KOP #1 (Intersection of I-40 and Meteor Crater Road)

This depicts one possible view of the proposed wind park. The view pans from the southeast to the southwest from a point near the intersection of Interstate 40 and Meteor Crater Road. The rim of Meteor Crater is located near the left-hand side of the photograph and Anderson Mesa is located near the right-hand side of the photograph. This simulation depicts an initial wind park phase of up to 250 MW. WTGs are depicted at a height of approximately 430 feet, with the nearest WTGs approximately eight miles away, located within background views.

Grapevine Canyon Wind Project

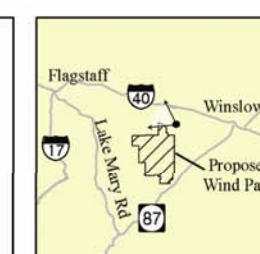


Photo

Simulation

Proposed Action - KOP #2 (Meteor Crater Visitors Center)
This depicts one possible view of the proposed wind park. The view pans from the west to the north, typical of the viewshed experienced through the Meteor Crater Visitors Center picture window. The rim of Meteor Crater is located near the left-hand side of the photograph and the San Francisco Peaks are located in the center of the photograph. WTGs are depicted at a height of approximately 430 feet, with the nearest WTGs approximately three and one-half miles away, located within middleground views.

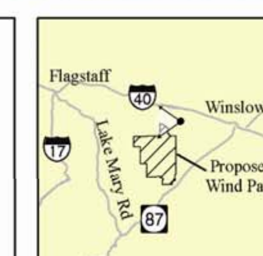
Grapevine Canyon Wind Project



Proposed Action - KOP #3 (Meteor Crater)

This depicts one possible view of the proposed wind park. The view pans from the southwest to the northwest from a point along the rim of Meteor Crater. The rim of Meteor Crater is located in the foreground near the left-hand side of the photograph and Anderson Mesa is located in the background of the photograph. WTGs are depicted at a height of approximately 430 feet, with the nearest WTGs approximately three miles away, located within middleground views.

Grapevine Canyon Wind Project



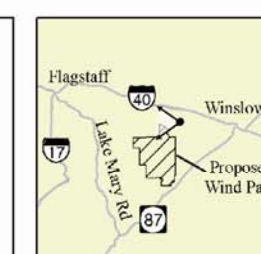
Photo

Simulation

Proposed Action - KOP #3 (Meteor Crater)

This depicts one possible view of the proposed wind park. The view pans from the southwest to the northwest from a point along the rim of Meteor Crater. The rim of Meteor Crater is located in the foreground near the left-hand side of the photograph and Anderson Mesa is located in the background of the photograph. This simulation depicts an initial wind park phase of up to 250 MW. WTGs are depicted at a height of approximately 430 feet, with the nearest WTGs approximately four and one half miles away, located within background views.

Grapevine Canyon Wind Project



Proposed Action - KOP #4 (Chavez Pass Road)

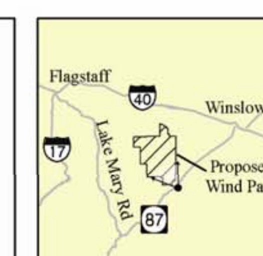
This depicts one possible view of the proposed wind park. The view pans from the northwest to the northeast from a point along Chavez Pass Road, near the base of Chavez Mountain. Anderson Mesa rises from the left-hand side of the photograph extending to the center and the San Francisco Peaks are visible in the distant background near the extreme left-hand side of the photograph. WTGs are depicted at a height of approximately 430 feet, with the nearest WTGs approximately one and one-half miles away, located within middleground views.

Grapevine Canyon Wind Project

Proposed Action - KOP #5 (State Route 87)

This depicts one possible view of the proposed wind park. The view pans from the northwest to the north from a point along State Route 87. Anderson Mesa rises near the left-hand side of the photograph and West Sunset Mountain rises near the right-hand side of the photograph. In addition, the San Francisco Peaks are visible in the distant background near the left-hand side of the photograph. WTGs are depicted at a height of approximately 430 feet, with the nearest WTGs approximately one mile away, located within middleground views.

Grapevine Canyon Wind Project



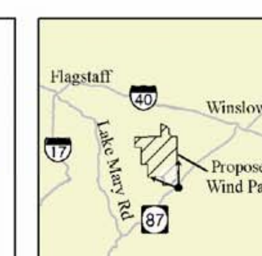
Photo

Simulation

Proposed Action - KOP #5 (State Route 87)

This depicts one possible view of the proposed wind park. The view pans from the northwest to the north from a point along State Route 87. Anderson Mesa rises near the left-hand side of the photograph and West Sunset Mountain rises near the right-hand side of the photograph. In addition, the San Francisco Peaks are visible in the distant background near the left-hand side of the photograph. This simulation depicts an intitial wind park phase of 250 MW. WTGs are depicted at a height of approximately 430 feet, with the nearest WTGs approximately 12 miles away, located within background views.

Grapevine Canyon Wind Project



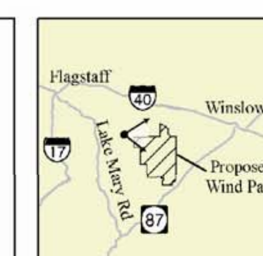
Photo

Simulation

Proposed Action - KOP #6 (Forest Road 125)

This depicts one possible view of the proposed wind park and transmission tie-line. The view pans from the northeast to the southeast from along Forest Road 125 as it drops from Anderson Mesa. WTGs are depicted at a height of approximately 430 feet, with the nearest WTGs approximately two and one-half miles away, located within middleground views. Tie-line towers are depicted at a height of approximately 120 feet and spaced about 1,000 feet apart. The nearest tower is located approximately one-half mile away, within foreground views.

Grapevine Canyon Wind Project



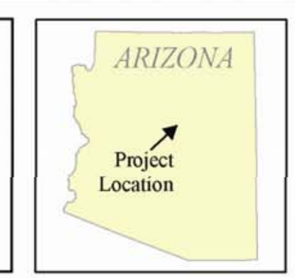
Proposed Action - KOP #7 (Intersection of Forest Road 125 and Forest Road 82)
This depicts one possible view of the proposed transmission tie-line. The view pans from the northeast to the east from a point along Forest Road 125 near the intersection of Forest Road 82. Tie-line towers are depicted at a height of approximately 120 feet and spaced about 1,000 feet apart. The nearest tower is located within immediate foreground views, approximately one-tenth mile away.

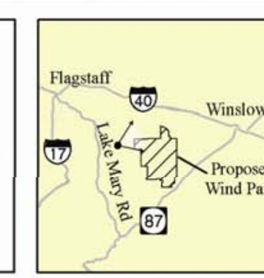
Grapevine Canyon Wind Project

Proposed Action - KOP #7 (Intersection of Forest Road 125 and Forest Road 82)

This depicts one possible view of the proposed transmission tie-line. This photographic simulation was prepared as if the vegetation were removed, or drastically changed. The view pans from the northeast to the east from a point along Forest Road 125 near the intersection of Forest Road 82. Tie-line towers are depicted at a height of approximately 120 feet and spaced about 1,000 feet apart. The nearest tower is located within immediate foreground views, approximately one-tenth mile away.

Grapevine Canyon Wind Project





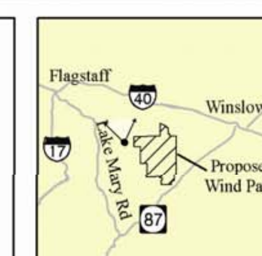
Photo

Simulation

Proposed Action - KOP #8 (Forest Road 82)

This depicts one possible view of the proposed transmission tie-line. The view pans from the northwest to the northeast along Forest Road 82, just south of Forest Road 125. Mormon Mountain rises above the trees slightly near the left-hand side of the photograph. Tie-line towers are depicted at a height of approximately 120 feet and spaced about 1,000 feet apart. The nearest tower is located within immediate foreground views, approximately one-tenth mile away.

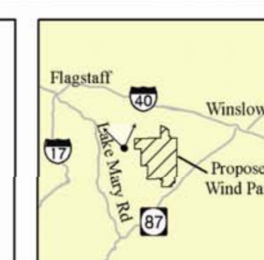
Grapevine Canyon Wind Project



Proposed Action - KOP #8 (Forest Road 82)

This depicts one possible view of the proposed transmission tie-line. This photographic simulation was prepared as if the vegetation were removed, or drastically changed. The view pans from the northwest to the northeast along Forest Road 82, just south of Forest Road 125. Mormon Mountain rises near the left-hand side of the photograph and the San Francisco Peaks are located in the distant background near the center of the photograph. Tie-line towers are depicted at a height of approximately 120 feet and spaced about 1,000 feet apart. The nearest tower is located within immediate foreground views, approximately one-tenth mile away.

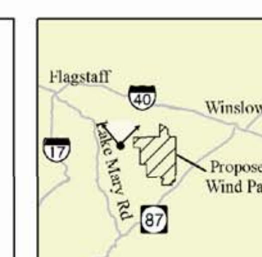
Grapevine Canyon Wind Project



Proposed Action - KOP #9 (Forest Road 125 and Existing Transmission Line Corridor)

This depicts one possible view of the proposed switchyard and transmission tie-line. The view pans from the northwest to the northeast from a point near the intersection of Forest Road 125 and the existing Western transmission line corridor. The existing transmission line structures are approximately 120 feet tall and the proposed tie-line towers are also depicted at this height, spaced about 1,000 feet apart. The switchyard and the nearest tie-line tower are approximately six-tenths mile away, located within middleground views.

Grapevine Canyon Wind Project

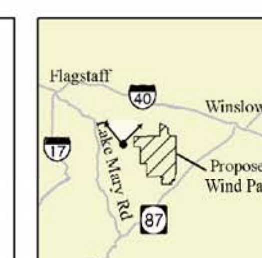


Photo

Simulation

Proposed Action - KOP #9 (Forest Road 125 and Existing Transmission Line Corridor)

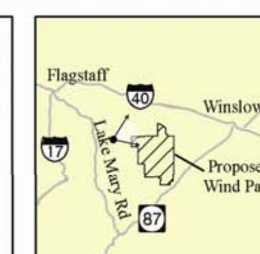
This depicts one possible view of the proposed switchyard and transmission tie-line. This photographic simulation was prepared as if the vegetation were removed, or drastically changed. The view pans from the northwest to the northeast from a point near the intersection of Forest Road 125 and the existing Western transmission line corridor. The San Francisco Peaks are visible in the distant background near the left-hand side of the photograph. The existing transmission line structures are approximately 120 feet tall and the proposed tie-line towers are also depicted at this height, spaced about 1,000 feet apart. The switchyard and the nearest tie-line tower are approximately six-tenths mile away, located within middleground views.



Alternative Transmission Line Corridor - KOP #7 (Intersection of Forest Road 125 and Forest Road 82)

This depicts one possible view of the alternative transmission tie-line. The view pans from the northeast to the east from a point along Forest Road 125 near the intersection of Forest Road 82. Tie-line towers are depicted at a height of approximately 120 feet and spaced about 1,000 feet apart. The nearest tower is located approximately one-half mile away, within foreground views.

Grapevine Canyon Wind Project

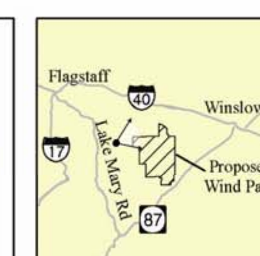


Photo

Simulation

Alternative Transmission Line Corridor - KOP #7 (Intersection of Forest Road 125 and Forest Road 82)
This depicts one possible view of the alternative transmission tie-line. This photographic simulation was prepared as if the vegetation were removed, or drastically changed.
The view pans from the northeast to the east from a point along Forest Road 125 near the intersection of Forest Road 82. Tie-line towers are depicted at a height of approximately 120 feet and spaced about 1,000 feet apart. The nearest tower is located approximately one-half mile away, within foreground views.

Grapevine Canyon Wind Project



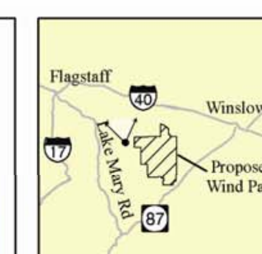
Photo

Simulation

Alternative Transmission Line Corridor - KOP #8 (Forest Road 82)

This depicts one possible view of the alternative transmission tie-line. The view pans from the northwest to the northeast along Forest Road 82, just south of Forest Road 125. Mormon Mountain rises above the trees slightly near the left-hand side of the photograph. Tie-line towers are depicted at a height of approximately 120 feet and spaced about 1,000 feet apart. The nearest tower is located approximately three-tenths mile away, within foreground views.

Grapevine Canyon Wind Project



Alternative Transmission Line Corridor - KOP #8 (Forest Road 82)

This depicts one possible view of the alternative transmission tie-line. This photographic simulation was prepared as if the vegetation were removed, or drastically changed. The view pans from the northwest to the northeast along Forest Road 82, just south of Forest Road 125. Mormon Mountain rises near the left-hand side of the photograph and the San Francisco Peaks are located in the distant background near the center of the photograph. Tie-line towers are depicted at a height of approximately 120 feet and spaced about 1,000 feet apart. The nearest tower is located approximately three-tenths mile away, within foreground views.

Grapevine Canyon Wind Project